JUN 21 1922

THE GEOGRAPHICAL JOURNAL

GENERAL LIBRARY
JUN 1922
UNIV. OF MICH.

Vol. LIX No. 6 June 1922

Captain Shakespear's Last Journey . . . Douglas Carruthers 401
Geological Results of the Mount Everest Expedition, 1921
A. M. Heron 418
Luristan: Pish-i-Kuh and Bala Gariveh . . . C. J. Edmonds 437
A Survey of the Euphrates Valley from Deir-ez-Zor to Aleppo
Major C. G. Lewis 453
The Permanent Committee on Geographical Names
Lord Edward Gleichen 457
The Mount Everest Book 459
Reviews The Monthly Record Obituary Correspondence
Meetings of the Society
Title-page, Contents, Index, etc., to Vol. LIX.
Contents v
Society Notices vi

LONDON
THE ROYAL GEOGRAPHICAL SOCIETY
KENSINGTON GORE S.W. 7
EDWARD STANFORD, LTD. 12 LONG ACRE W.C. 2

Price Two Shillings

TO BE PUBLISHED SHORTLY:

BIBLIOTHECA ORIENTALIS.

(Sotheran's Price Current of Literature, No. 781) consisting of a large and interesting collection of BOOKS ON EASTERN LIFE AND THOUGHT, illustrating Travel and Adventure, Art and Science, Sporting, etc., in ASIA, EGYPT, and the EUROPEAN EAST, as well as ORIENTAL PHILOLOGY AND LITERATURE: including the Libraries of the late Sir George Birdwood, the late Sir Richard Carnac Temple, and others.

A copy will be sent post free on application to

HENRY SOTHERAN & CO., 140, Strand, W.C.2, and 43, Piccadilly, W.1, London.

V&S LTD

TO EXPLORERS, AUTHORS & PUBLISHERS OF SCIENTIFIC AND OTHER BOOKS

Have your Illustrations reproduced by the

VITSEATONE PROCESS

in Monotone and Colour

For full particulars apply:

VITTY & SEABORNE LTD.

3 CRANE COURT, FLEET STREET, LONDON, E.C. 4

Telephone: City 8865 *Telegrams:* "Vitseatone, Fleet, London"

However 'light' you travel—

make room for

BOVRIL

—you're sure to need it.

The Geographical Journal

Vol. LIX No. 6 June 1922

CAPTAIN SHAKESPEAR'S LAST JOURNEY

Douglas Carruthers

(*Continued from p.* 334.)

SHAKESPEAR had been preceded at Riyadh by Reinaud (1793–5), Sadlier (1819), Pelly (1865), Palgrave (1862), Leachman (1912), and Raunkiaer (1912). Each of these travellers had given his own special impressions of the capital of southern Nejd, from the sum-total of which we already had a very fair idea of its size, society, trade, climate, and condition. But the Wahabi centre never fails to interest. Should a traveller venture thither this very year, an account of his experiences would be received with renewed interest and unabated enthusiasm. For although the geographical problems of inner Arabia are being rapidly solved, a haze of mystery still envelops its human affairs. Moreover, we have learnt of late, and are due to learn again, a lesson which we should have known and profited by long ago, namely, that the "Wadi Hanifa seems destined to be at least independent of other Arabian districts, if *not predominant* among them." *

Shakespear was on intimate terms with the ruling Emir and his father, Abd er Rahman, who still retained the Imamship of the Emirate. He spent a portion of each day at the palace, and although he tells us nothing of politics, he doubtless learned a lot which he never wrote in his diary! At his camp in the date grove of Shamsiya † he received the

* Hogarth in 'Penetration of Arabia.' His summing up (eighteen years ago) of the political importance of Riyadh is worth quoting, for at the present moment the star of the Saud is again in the ascendant. "Under any political conditions the unfailing ground-water of Hanifa ensures the existence of populous settlements in this valley. Those for which we have the description of eye-witnesses appear to contain a society more considerable, better united by natural conditions, and of greater resources than any other in Nejd. . . . It is neither hard to understand how this fixed population of wealthy farmers, traders, and merchants, thickly sown along a valley above 100 miles long, came to take an independent religious position, and to exercise so great an influence over the thinly-peopled steppes of the peninsula, nor easy to believe that its present subjection to the Bedawins of Jabal Shammar can be other than a temporary eclipse."

† This garden, Shakespear says, "was planted by Mahbub, the slave mentioned by Palgrave and Pelly. The well is a stone-lined shaft about 20 feet square, the stones being dressed to fit without the use of cement. Its output is 'twelve buckets.'"

return calls of the Sheikhs and their sons.* He also watched the mobilization of a great raiding expedition. The *Jaish* (army, in town speech; troops of *Thelul* riders, in Bedawi: see Doughty, vol. I, p. 431) mustered near by, and the camels were divided up amongst the fighting men. "I got some good photos of a sight probably no European has seen. Also saw Abdul Aziz lose his temper more than once. Suddenly called to prayer in the middle of all this, the whole crowd formed three long lines, and Abdul Aziz led the prayer. There must have been at least three hundred present." In company with this "ghazzu" Shakespear eventually left Riyadh. The local contingent mobilized in the central square of the town. "Abdul Aziz was squatting on the ground, cursing his *hamla* (caravan, cortège), while his men were spending the last moments in putting the final touches to a spear or sharpening a tent-peg. The cavalcade moved off when Abdul Aziz had bought a case of Anglo-Persian Palm Tree Brand oil, a carpet, and some dates." Shakespear rode with the Emir and the standards, which were green with the "*kalima*" † on them in white. Then followed short slow stages, with long intervals in camp. Shakespear wrote letters, visited the various coffee-hearths, was overwhelmed with patients craving medicine and medical aid, while the *Jaish* roared loudly during the process of being treated for mange by a Jew doctor. The line of march led northwards, and he found himself back at Banban. Here Abdul Aziz and the Sheikhs left him, supplying three *ageyl* (*uqeil*)—the official guides of the desert—to convey him on to Kasim. Thus Shakespear found himself making for northern Nejd by a new route. Instead of following up the Hanifa wadi-bed, past the ancient settlements of Daraiya, to Ayaina, Tharmida, and Shakra—the usual route for caravans coming or going between Kasim and Riyadh—he was to see the towns of central Mahmal, situated on the southern slopes of the Aridh hills. This stage of 90 miles, from Banban to Shakra, filled in a big blank, and linked together the sketch-maps and descriptions of Palgrave, Pelly, and Raunkiaer, which combined gave but a poor idea of the true lie of the country.

On March 8 Shakespear found himself on new ground. Leaving Banban he turned westwards, and the next day dropped down into the upper Malham shaib—"quite a good-sized gorge here, like the Jalajil one," the right bank rising a good 200 feet sheer from the wadi-bed. For Malham oasis itself Shakespear is our only witness. It has "very extensive date groves, and consists really of two separate villages—a mile

* It is interesting to note that Shakespear found "Palgrave's plan of Riyadh exceedingly good, although the palaces of the Saud were all demolished by Ibn Rashid, excepting a square fort in Abdulla's Kasr, which was Ajalan's house until Abdul Aziz killed him. The Sheikhs are again rebuilding the Kasrs; that of Faisal is now Abdul Aziz's, Abdulla's is unoccupied, Mahd has taken Jalowi's, and so on. Quite a third of the town is taken up by the houses of the Ibn Saud family."

† Either the formula, "There is no God but Allah," or the battle-cry, "Victory is of God. Success is near."

apart," that on the left bank of the shaib being called Ruwaika. The two villages together contain some 600 to 700 houses. The water-supply is controlled with some skill, as Shakespear's photograph of a primitive aqueduct shows—palm trunks and mud being the mediums used for conveying irrigation water across a dry wadi-bed. The inhabitants, he says, were mostly Sebei and Ateibah (there are also settled Beni Khalid). Following up the wadi he came to Jarina—400 houses or less inhabited by Ateibah folk, with gardens in proportion. Close by was Haraimla, ranking at 500 houses (perhaps 2000–3000 souls, certainly not 10,000, as Palgrave estimated), and possessing a wide expanse of open cultivated areas, which the other villages of the Malham valley do not possess. Shakespear noted lemons, oranges, figs, pomegranates, and grapes. The wells were deeper than those of Riyadh, the motive power being donkeys in place of camels. There were many ruins, a sign that the place had not recovered since the Egyptian occupation. The inhabitants, he notes, were nearly all Ateibah. The castle built by Ibrahim Pasha which so astonished Palgrave, "was not as he suggested," on rising ground, "unless a rise of 10 feet can be called such. It was good enough for Ibn Saud to have to resort to stratagem to take, twelve years ago; but it has since been demolished—the stones being used for building local dams." Raunkiaer had only camped a night outside Haraimla, while Palgrave, who slept within the walls, passed on next morning like Raunkiaer to Sadus, but he discourses at length (18 pages) on Haraimla as the birthplace of Mohammed ibn Abd el Wahab, which indeed is its chief claim to fame. Neither Shakespear nor Raunkiaer noted cultivation or settlements above Haraimla; on this score Palgrave's itinerary from Thadik to Haraimla is worth quoting, if only as an example of the difficulties which confront compilers of Arabian maps. On this stage Palgrave sees "the town of Hoolah, a large and busy locality; the size and outline of its towering walls reminded me of Conway Castle. . . . This town, men say, is one of the most flourishing in Sedeyr. . . . We left behind us many other villages and hamlets of less note, near and far, till after a few hours we reached at sunset the town of Horeimlah." Whether populated or not, the region is mostly high bare plateau, the crest of the Tuwaik, in fact, rising to a watershed of about 2600 feet;* the track then drops by a steep and difficult descent to a nameless valley (draining to the Shaib el Ats) in which Thadik is situated. "The climb down was very steep, and was in two flights so to speak. From the top of the first I could throw a stone clear of the track below. There was also a deep gorge on the west side. This is said to be the easiest pass across the Tuwaik," but it was so bad that Shakespear was at a loss to imagine what the others were like. The others were "the ordinary caravan route from

* Shakespear did not take a boiling-point reading at the pass, but there is an aneroid reading in his notes, which is much in error, but, reduced in proportion to his reliable hypsometric series, gives 2567 feet.

Riyadh up the main Wadi Hanifa, leading *viâ* Ayaina over to Barra; another to the south (evidently by the Sakta gorge of Philby) leading to Dhruma; one *viâ* Sadus, another by way of Bir (east of Thadik); the Jalajil *route* (which has not been followed, but must go by Ma'ashaiba and El Haraij to Shakra); lastly, the Ghat-Majma'a pass.*

Shakespear passed Thadik without entering; curiously enough Palgrave did the same, while Raunkiaer "arrived after dark and left before dawn," so we know little or nothing of the town except that it was reported to Palgrave as being "a considerable village, a small town in fact equal to Mejma'a," and that Shakespear saw it "quite a big place, with very considerable gardens, carefully walled in." The mountain region of Nejd —rugged Aridh—was now left behind; from the crest of the last ridge Shakespear had sighted red Nafud, and on passing Thadik he entered again a region of sand and steppe. On March 19 the Shaib el Ats was crossed again, here also known as Shaib umm Sidr; its source was 25 miles still further south. Camp was outside Kassab, a village of five hundred houses. Most of the region traversed that day showed evidence of partial cultivation, tended by husbandmen from scattered and isolated farms; evidently a country safe from raiders. There was another small colony of cultivators at Nakhail el Ab (thirty houses) tucked away under the lee of a Nafud, which lies between Kassab and Shakra. Shakespear found the crossing of this sand-bed an easy matter. From the dunes he could look down on Shakra oasis, with its outlying hamlets of Karain and Kusur Sanaidi. This Nafud Shakri (or Araij el Bildani)† is but a 4-mile wide belt at Shakespear's crossing, but it is of interest as defining the south-eastern limits of Washm, which district Shakespear now entered at its capital—the large, clean, well-built town of Shakra. Former travellers had spoken well of this oasis; Shakespear also found himself hospitably entertained by an enlightened Emir, one Mahd ibn Saud (no relation of *the* Saud) whom he had met at Khafs the year before. He halted a day, heard much of local history—which contained stirring tales of the 45-day resistance Shakra made when ibn Rashid laid siege to the town, repacked his kit, and got rid of one of his *rafiks* (of the Muteir)—"a more lazy devil I have never struck." Shakra he estimated at 1000 to 1500 houses; the gardens seemed small, but the well-water was unfailing, "unaffected by the rainfall," being 12 fathoms deep.

* To these should be added the Audah-Thadik route, by which Raunkiaer, and probably Palgrave, passed. The former had to search "the cliff-wall" before finding a possible means of descent.

† This sand-belt is really a tongue of the very extensive Nafud which covers practically the whole of Washm, being a continuation of El Bittar of the Ajibba and Zilfi region. The main bed occupies probably some 2500 square miles between Zilfi, Mudhnib, and Shakra (or it may be divided into separate belts, no one having seen it). It is limited on the east by the Tuwaik escarpment, and on the west by the Es Sirr depression.

"SHAKESPEAR RODE WITH THE EMIR AND THE STANDARDS"

ABDUL AZIZ ES SAUD (IN CENTRE)

MOBILIZATION OF CAMELS FOR A RAID BY IBN SAUD

DISTRIBUTION OF CAMELS AMONGST THE FIGHTING MEN

DISTRIBUTION OF CAMELS AMONGST THE FIGHTING MEN

Shakespear was now on ground already traversed by Sadlier and Leachman, and to be seen again by Philby four years later. He was, in fact, on the main caravan route which threads Central Nejd, connecting the oases of the north—Buraida and Anaiza, with the populous settlements of Wadi Hanifa, and linking up the string of towns and villages which lie along its course. The route first runs west towards Janaitha 50 miles away, the stage being remarkable for its sand-belts. The first of these—Nafud Batra—was reported to Shakespear as being "separate to itself, *not* joined to other Nafuds," while his travelling companion told him that "old men often used to speak of this ground being flat and smooth with practically no sand on it in years gone by." Whether there is any truth or not in these statements remains to be proved. We do know that there is an immense sand area to the north, and another, the Nafud Kunaifida, to the south. If the Nafud Batra *is* a small isolated patch, it may have collected there in recent years.

While encamped in the middle of this Nafud Shakespear was raided, in the usual Bedawin fashion, by a small ghazzu "learning the business." The marauders were Ateibah out to plunder Muteir, but they sighted Shakespear's camp at sunset, and decided to improve the opportunity God had given them. When camp was quiet one of their number reconnoitred Shakespear's tent, where he was asleep, caught up a few trifles, such as saddle-bags and coats, and returned to his friends, doubtless with a story of great booty. The younger men wanted to fire into the tents, kill all they could, and loot camels and kit. The older men said they must make sure that there was no Ateibah *rafik* with the party. Such is the strength of the *rafik* free-masonry! At this juncture Shakespear awoke, found his tent disarranged, and gave the alarm. Examination showed footprints and two Martini cartridges dropped by mistake. The Ateibah *rafik* walked out into the night and shouted, "We are Ibn Saud's men. No one must pass near this camp. If you are Ateibah, I am the *rafik*—I, Talag. We are Ibn Saud's men. One of us has had his saddle-bags taken. If you are Ateibah make restitution." After a few moments there was a chorus of yells from apparently every bush within 50 yards. "You are not Ibn Saud's men. You are townsmen. We know Talag. It is not Talag. If you are Ibn Saud's men speak truly." "This was answered by Talag—the Ateibah, and Thami—the Shammari, swearing and shouting that they were what they said and invited one of the unseen who knew Talag to advance and verify him. On this a mob of men were in amongst the tents like a flash, shouting, yelling, grabbing each other, swearing, denying. Suddenly a gun went off, and I thought the show had begun, but fortunately everybody cursed everybody else, and no one else fired." It all ended in coffee drinking, an episode typical of the desert! "Having had a look at the mob round the fire, a more villainous-looking crew I never saw, who were all shouting and explaining at once, varied by the most careless unloading of rifles, I went back to

my tent and bed." The stolen goods were produced, and the raiders demanded the return of *four* Martini cartridges in place of the two!

The following day the second and more formidable sand-barrier, Nafud es Sirr, was crossed. It took six hours, representing 16 miles. Under its western *lughf*, or lee, was Junaitha (Ain el Junaitha), a "small square walled town with only one gate, containing some two hundred houses, inhabited almost entirely by Hutaim tribesmen." It depended for water on a typical Persian *karez*, or underground canal, which came from the edge of the sands towards the south-east. Shakespear immediately noted the prevalence of salt ground, which is the bane of Es Sirr—the long saline depression which stretches northwards to the borders of Kasim and comprises topographically, if not socially, a self-contained area, separate from Washm. Es Sirr is the descriptive name for the hollow between the two sand-beds—Nafud es Sirr on the east, and Nafud Shakaika on the west; on old maps it was named Wadi es Sirr, or the Wadi of Washm, the ground fall being actually to the north, but it is mostly waterlogged: hence its saline, unhealthy nature. Junaitha is but the principal of many scattered hamlets and isolated fortified farmhouses; hence its other name Ayun es Sirr, the springs of the Sirr, a generic title for the whole group of settlements, since none (with perhaps the exception of Mudhnib and Junaitha) is of sufficient importance to dominate the whole. But although the Sirr valley exhibits a host of place-names, it must not be considered a well-favoured region. Its soil is poor, its wells brackish, its population all told probably does not exceed five thousand souls. Shakespear followed up the line of Kasrs and fortified *chateaux*, as his forerunners had done; there is scarcely a variance in their routes, all coming within sight of each other, which shows how narrow is the belt of settled life under the Nafud edge.* On his right hand, parallel to his

* The only other European who could have seen the Sirr is the German, Baron Edward Nolde. Having penetrated as far as Anaiza in 1893, he was escorted further south "three very hard marches" to visit the then victorious Muhummad ibn Rashid, who was receiving the submission of the Emir of Riyadh. He makes no mention of the Sirr villages, although he must have passed through them, as it is the only road southwards. He gives us no clue as to his destination, except that he left Shakra to the left, and passed over Nafud. Finally, the Emir's headquarters were five hours on beyond his "three very hard marches," and on arriving there, "Shakra and Riyadh, each about 60 kilometres away, could provide us with fresh butter and meat." Three hard marches of 50 miles each (a possible feat) and five hours would have taken him well into the Hanifa basin, in the neighbourhood of Barra, whence Riyadh and Shakra would be more or less equidistant at 80 kilometres.

† Sadlier's itinerary up the Sirr valley is difficult to follow, for the country had been devastated by the evacuating army. He evidently entered by Junaitha, having crossed the sands from Shakra, and this he calls *Aiceoon* ul Sirr [or *Aiuoon* = Ain]. He must have passed north on the same line as later travellers. *Aiceooneeat*, or *Aiooneat*, "a lake of rain-water," would be one of many in the water-logged valley. His "ruins of a walled village" to the left, 6½ hours before reaching Murraba, is probably Qasr Amar, which stands alone to the west of the route. *Mooruba*, "only showing marks of former habitation," is now the more or less thriving Murraba. His lake called

route at 5–6 miles, rose a *Jal*, rocky escarpment, which apparently kept the Nafud within bounds. Passing Marabba, a group of detached *kusur* with their own gardens or wheatfields, comprising a dozen families of Nawasir (Beni Tamim), he came to Mudhnib, "which gave the impression of a scattered town or a group of hamlets, as it took me an hour to clear it and its gardens." Its three hundred houses were inhabited by inhospitable Beni Tamim tribesmen who had extensive date groves, but endured a pestilential climate. "At one time Mudhnib was very fanatical and was the centre of Akhwan puritanism, which has since overspread all Nejd." Shakespear was lucky in finding the one well of sweet water, which the surly inhabitants had refused to show to Leachman, especially as he had a 25-mile waterless stage before him, for from Mudhnib he branched off, like Sadlier, to the north-west, and headed for Anaiza instead of continuing northwards to Aushaziya (Aufiziya) and Buraida. A stony steppe,* with broad ill-defined wadis (like the Summan) extended right up to the walls of Anaiza, which Shakespear entered by the east gate at noon on March 26. He "camped just under the walls in the Zilfi people's camping-place, and sent off Thami with letters which brought the Emir and all sorts of people out to call on me before I had dressed. I changed hurriedly, and received them. In the afternoon I rode through the *suk* and returned the calls. Everybody seemed genuinely pleased to meet me, and all clamoured for me to go and have coffee or a meal at their hearth—a great difference to the rest of Nejd." Shakespear found himself in the world again. Anaiza was cosmopolitan, even civilized; he found smoking prevalent, and he was able to talk with people who had dealings with Egypt and India, Mesopotamia and the Holy Cities. "After coffee with the Emir, Saleh ibn Zamil, went on to Nasir's, where Mahd es Suleiman turned up; thence to the famous Nejdi doctor's, Ibn Saeed, who claims to have cured Sheikh Mubarak (Koweit) of his illness last year. A most delightful reception." The following day: "To the Emir's for breakfast; very good food, which I enjoyed in spite of fingers. Afterwards coffee at the house of a dear old deaf man, whose brother was the Mukbil el Thakair at Bahrein. After this a walk over to Mahd es Suleiman's house, which was exceedingly well furnished. Saleh and others mentioned previous visitors, all seeming to be full of praise of 'Khalil' (Doughty); they also mentioned Huber, and one who was killed in the desert near Medina by Harb tribesmen.† Got a good noon sight (meridian altitude of the sun for latitude); then, after evening prayer, dined with Saleh. Later was taken by him to see his date garden, a delightfully cool, green spot, with figs, lemons, vines, peach and citron

Khubrah is one of the many khubrahs, or water-pans, in the locality. *Moaznib* (Mudhnib) lay to the north, and thence *Aniseh*.

* Across which runs the undefined southern boundary of Kasim.

† We know of no one who was killed near Medina besides Huber, who was murdered by his own guides near Rabugh, in Harb territory, on his return journey to Hail.

trees in it. Thence a walk home through more date gardens, and climbed to the fort above the east gate, from where I got a splendid view of the town and its gardens, the walled town lying in date groves which are also walled, only two or three gardens being outside; it is, in fact, a fortress within a walled oasis. A big Nafud runs up from the south-west and encircles the town round the north." Shakespear's daily record is in strange contrast to the bald facts recorded by Huber and to Doughty's sorrowful tale.

On March 26 Shakespear pushed on to Buraida in the hope of catching the *ageyl* before they left for the north. He took the direct track, and accomplished the stage of 18 miles in 5 hours. Slow progress, he remarks, owing to watering camels and heavy sands. Shakespear, too, viewed "the many green villages of this country in their winding sheet of sand," and realized why Arabians say "Kasim is all Nefûd" (Doughty, 2, p. 312). He learnt, too, the secret of these pleasant oases in the deep sand-beds, for the land is seamed by the trough of the great wadi Rumma, where water lies only a few feet below. If "in the Nefûd plain of Kasim the course of the great wady is sometimes hardly to be discerned by the eyes of strangers" (Doughty, 2, p. 392), anyway between Anaiza and Buraida Shakespear found it" a fine sight with its dates and ribbon of green," bordered by deep Nafud. The wadi itself was about a mile or mile and a half in width, and like the Batin a "deepish ravine."* He reports the same phenomenon which Doughty was told of, namely, that "after heavy rains, especially when it has rained in the Harra (that is, the Kheibar Harra where the Rumma has its source), the water runs here up to 6 and 9 feet deep for a week or more, and that the wadi is impassable for as much as fifteen to twenty days. After such a flow the Khabra (that is the Khabra el Wadi or Zikaibiya backwater, to the north-east of Anaiza), will hold water 3 and 4 fathoms deep, forming a huge lake from which the Bedawin may drink for upwards of 6 months." Doughty speaks of this same *Zighreybîeh*—"a great rautha, with cornlands, which are flooded with seyl-water in the winter rains" (Doughty vol. 2, pp. 392, 314). Leaving the wadi Shakespear passed over Nafud, varied by *khubs* (depressions) with flat white chalky bottoms, and an occasional *sabkha* (saline marshy ground). At last he sighted Buraida, like Doughty, from "a brow of the Nefûd," and saw the same "dream-like spectacle!—a great clay town built in this waste sand with enclosing walls and towers and streets and houses! and there beside a bluish dark wood of ethel trees, upon high dunes! . . . I saw, as it were, Jerusalem in the desert!" Shakespear "camped in the sandy plain under the fort in the north face of the town wall, in fact the place described by Palgrave ['Central and Eastern Arabia,' 1, chap. vii.]. The north wall of the town must be nearly, if not quite, a mile long."

* Doughty crossed it at the same point: "The soil shelved before us; and under the next tamarisks I saw a little oozing water. We were presently in a wadi bottom, not a stone-cast over; and in crossing we plashed through trickling water." Huber had crossed the wadi, a little higher up, in half an hour.

THE TUBAIK RANGE FROM THE S

WADI RUM (LOOKING NORT

IGE FROM THE SOUTH

LOOKING NORTH)

OASIS OF JAUF EL AMR (LO

INTERIOR OF KASR M

OASIS OF JAUF EL AMR (LOOKING NORTH-WEST)

INTERIOR OF KASR MARID, JAUF

Shakespear had now reached mid-Arabia, Buraida being considered the halfway house between Iraq and the Hejaz, yet he was still less than a third of his way across the peninsula to Egypt. During his transactions at Buraida for safe conveyance onwards, he experienced what Doughty, Leachman, and Raunkiaer had experienced before—namely, that the inhabitants, in spite of their more than usual acquaintance with the outside world, are fanatic, inhospitable to strangers, and shameless in their dealings.* Shakespear spent two days in discussing prices and other details for getting on to Egypt, and ended by paying heavily for what turned out to be very poor service. One Ali er Ribdi supplied six camels and *Ageyl* † to convey him to Damascus or Egypt. His choice of route was probably due to chance. The most usual one would have taken him onwards to Jebel Shammar and Hail, whence the well-worn track across the Nafud leads to Jauf. Or he might have followed along the southern edge of the sands, like Doughty, Huber, and others, from Hail to Teima, thence to Tebuk and Akaba. Luckily he followed neither of these now well-known tracks, but made a new line from Kasim to Jauf along the *northern* edge of the great sand-bed, a matter of 400 odd miles. Leaving Buraida he passed out of settled Nejd and re-entered nomads' land. For twenty-nine days he saw neither town, hamlet, nor cultivation, while for the whole distance between Buraida and Jauf he found no permanent abode of man, excepting one solitary Kasr. The journey, featureless as it was, proved of great use, for since all previous travellers had approached Kasin from the direction of Jebel Shammar, there remained a very extensive unknown area to the north of their routes, while our knowledge of the north-eastern limits of the Great Nafud and of the region at the sources of some of the great dry wadis which fall to the Euphrates was nil.‡

On the last day of March Shakespear struck north on a line between the Ajibba–Batin–Koweit caravan route and the string of oases which run north-westwards for some distance towards Jebel Shammar. He made rather slow progress owing to lack of camp helpers, but he kept up his survey without intermission, and this in spite of obvious ill health caused by poor food, indifferent water, and worry. His diary becomes more meagre, and shows a lack which cannot be altogether accounted for by the condition of the country he passed through. This northern frontier of Kasim is open steppe, devoid of interest and with little water, until the southern limits of the sand-belts and the Great Nafud itself are

* Doughty was assaulted and robbed, barely escaping with his life; Raunkiaer was refused food; Leachman found "it one of the few towns in Nejd in which I met discourtesy."

† The Ageyl (Uqeil), a sort of trading society composed of members who remain neutral to all feuds, and act as caravaners, without fear of molestation, throughout all Arabia.

‡ Leachman is our only authority for the region between the south Syrian Hammad and Kasim. His route was, with the exception of the last few marches, far to the north of Shakespear's.

approached. Here anyway there was relief from dull monotony, even if travelling was rendered more tedious. The first sandwaves on Shakespear's route were the Nawadhir, which Leachman (their routes crossed each other at this point) described as "a down-like wave of sand 300 feet high." There are really, as the name implies, two ridges, which Shakespear recorded—Nadhir el Adah and Nadhir el Hamaid. Leachman was told by the Arabs that these sands were connected with El Bittar, although on his map he distinctly shows them as an isolated dune. Shakespear, on the other hand, records them as separate, and of different sand, from El Bittar. At this particular point Shakespear was exactly 28 miles, as the crow flies, from his former camp at Ajibba, under the northern lee of El Bittar. Immediately after crossing the Nawadhir, however, he did actually come to the last northern waves of the Bittar sand-steppes, these seven narrow tongues of Nafud sands ending in the Khub Shama and the Zazzam.

The next day Shakespear watered at Zerud and reached historic ground, for Zerud * is one of the stations on the time-honoured Pilgrim route from Persia and Mesopotamia to Mecca, stations which we have known of from the early Moslem geographers, but which have not all yet been located by modern travellers. Shakespear was, in fact, on the Darb Zobeida, the trans-Arabian high-road commemorating the wife of Harun er Rashid, whose pious fancy was to lighten the hardships of this desert route. Zerud marks the parting of the ways, for hereabouts the traveller from Baghdad (or beyond) chooses his route, westward to Hail, south-east to Kasim, south-west to Mecca and Medina. There is, in reality, a group of wells in the hollow ground (Khub Shama), between the sands of Lazzam to the north, of Ash Ali to the south, and the Nafud † itself to the west; for Zerud, Shaba, Wasait, Hasima (Hasma), and even Shaiba (15 miles across a sand-spit to the west), may all be considered as marking the ancient route. He crossed the well-worn track of the Darb Zobeida on April 11, just to the east of a landmark, Tell Windiyat, which marks the eastern extremity of the great Nafud. Shakespear here experienced a long and irritating delay; his guides, who were *ageyl* taking camels to Damascus, dallied, while lost camels were rounded up, and stray sections of the caravan joined in. He was also running short of food, making the best of bad water, and rather sick. It was still doubtful whether they would march to Jauf by the trans-Nafud route (Hail–Jubba) or along the northern edge of the sands (the Lubba track). Rumours of Ruweilah raids, and the spectacle of Shammar herdsmen in retreat from the Lubba, almost caused the *ageyl* to take the southern route; but

* In those days Zerud boasted a kasr and reservoirs (*vide* Ibn Jubair). Shakespear found "only one big well in a basin like Hafar el Ats, brackish water, of a bad colour."

† Shakespear's survey here checks the routes of the Blunts (1879) and of Huber (1881) on their way from Hail to Nejef.

in the end the whole party moved on, a straggling caravan of four hundred odd camels. They followed along the Nafud fringe, but found, to their detriment, that on its north-eastern limits the Nafud has not the distinct boundary it shows elsewhere. Sandy tracks and tongues of higher dunes lead off to the east—parents, doubtless of the Ardh el Madhna and the Dahana belts. It was not until he had advanced another 120 miles that the Nafud showed that defined wall-like edge which is its special feature on other flanks. Watering from the wells of Taraba (obviously *Kasr Torba*, where the Blunts were refused water by Ibn Rashid's garrison *), which lay three or four hours to the east of this tract, they did not find water again until reaching Hayyaniya, another fortified post supported by the Emirs of Hail, as an outpost to protect their northern nomad frontier. Hayyaniya evidently performed the same function in Doughty's day, for he records that Ibn Rashid was upon an expedition and long encamped at *Heyennîeh*. "The Shammar princes have fortified it with a block-house; and a man or two are left in garrison, who are to shoot out at hostile ghrazzus: so that none shall draw water there, to pass over, contrary to the will of Ibn Rashid." The Kasr, of mud with lower courses of stone, guards a single well of good water at a depth of 26 fathoms. It lies immediately under the lee of the Nafud. Shakespear found it garrisoned by half a dozen of Ibn Rashid's men, who were relieved once a year. Hayyaniya marks an alternate route (to the Darb Zobeida) between Jebel Shammar and Irak, it being considered the safer route of the two when the Dhafir are raiding; it is noteworthy that Wallin, the earliest, and Miss Bell, the most recent of European travellers between Hail and Nejef, both passed this way. Hayyaniya is also a great nomad station; Shakespear saw it teeming with Shammar (Sin jarah) herds; while Nolde found it "enlivened by the presence of thousands of animals and herds of camels, belonging to the *Roala* (Ruweilah), who use the Nafud during the winter as their pasturage." †

At Hayyaniya Shakespear heard startling news. The *ageyl* ahead of him were warned to hurry on, as Ibn Rashid had murdered his Grand Vizier, Zamil ibn Subhan, and in consequence the Shammar were restless. "Apparently the Shammar had evinced a lack of faith in the Emir, and shown plainly that they would prefer Zamil as their leader. Accordingly young Saud ibn Rashid and the son of Saleh ibn Subhan put their heads together and determined to clear Zamil and his intimate friends out of the way. When on the march, somewhere near Abu Ghar,

* Huber spent some days here in 1881; he records two walled wells guarded by a kasr of clay.

† Nolde had come this way from Jauf, thus a forerunner of Shakespear's in the opposite direction. From Hayyaniya he turned south to Hail. He gives a detailed description of the locality, which tallies exactly with Shakespear's.

Actually the first visitor to Hayyaniya was the Italian Guarmani, who rode thither from Hail with the Emir's (Talal's) ghrazzu. He said that the blockhouse had recently been built, *i.e.* about 1860.

a slave came up from behind and shot Zamil in the back, killing him outright. Seeing this Zamil's brother and some others jumped on to their mares and made off. They were rounded up, however, and killed out of hand (an uncle, a cousin, a slave, and another man). While the murders were being carried out, young Ibn Rashid and Saud es Saleh rode on without paying any attention. Men were immediately despatched to make sure of Hail. A low-down crime, for if it had not been for Zamil young Saud ibn Abdul Aziz would not have been alive now." Shakespear only skirted the fringe of the Emirate of Jebel Shammar, but even he did not escape without experiencing something of its blood-stained annals, and recoiling from its barbarism. These tedious marches and long evenings round the coffee-hearth were relieved by the variety of his companions. There was, for instance, the Bedawi who had been to the Chicago Exhibition in charge of camels. He was a character in himself, and gave Shakespear some interesting information. We should like to know more about the European Christian, neither explorer nor antiquarian, who had come (with powers from Stambul) by way of Tebuk and Teima to Hail; thence, failing to do business with Ibn Rashid, had passed on to Nejef. That was in April 1914! Shakespear also had further trouble with his men, two of them absconding with their pay, and he lost his spare camels, which cost him much *backsheesh* to retrieve. Of information gathered, the description of a new trans-Nafud route to Egypt is of importance. "From Jubba, three days westwards over sands, to a watering esh Shigasa,* on the edge of the dunes. Hence two to two and a half days north-west of Fajr. Thence across the Hejaz railway at, or near, Mudawara, and on to Kuntilla. This road, though the shortest, is dangerous on account of Sherarat, Huweitat, and Ruweilah, and even Harb, Shammar, and Hutaim."

Three hard waterless marches over sand barriers † alternating with low-ground *Khubub*, brought Shakespear to another Kasr and well, Adhfa, situated in Khub Labba, "a well-marked depression, about 1 mile wide and like the Batin" which gives the track its name.‡ Adhfa was in ruins and

* We have no record of esh Shigasa, but we have the wells of Ubeid and Asafiya, at exactly three days (40 miles each) west of Jubba in a direct line with Fajr.

† Two of these, passed on April 21 and 22, were reported as running together and continuing eastwards as the Dahana.

‡ Huber describes the *Leubbeh* as a stony desert track, without wells, extending northwards from the Nafud to the wells of Hazil. It is one of the best pasturages of the Ruweilah when rain falls (see 'Journal,' pp. 181–3, 632, 633).

Shakespear made some interesting natural history observations on these stages. His men dug out a wolf's earth (like the jackal the Eastern wolves go to ground), and he kept and nursed one of the pups for some time. Later, three days east of Jauf, he was brought an ostrich chick. This is probably the most northern limit of the Arabian ostrich in these days. (I saw them at the same latitude further west.) But we have evidence that in former days they ranged all over the Syrian Desert right up to the Euphrates. See reports by eye-witnesses such as Bartholomew Plaisted in 1750, Sir Eyre Cote in 1771, Irwin in 1781, Major John Taylor in 1789, and Olivier in 1797.

WADI RUMMA BETWEEN ANAIZA AND BURAIDA (LOOKING SOUTH)

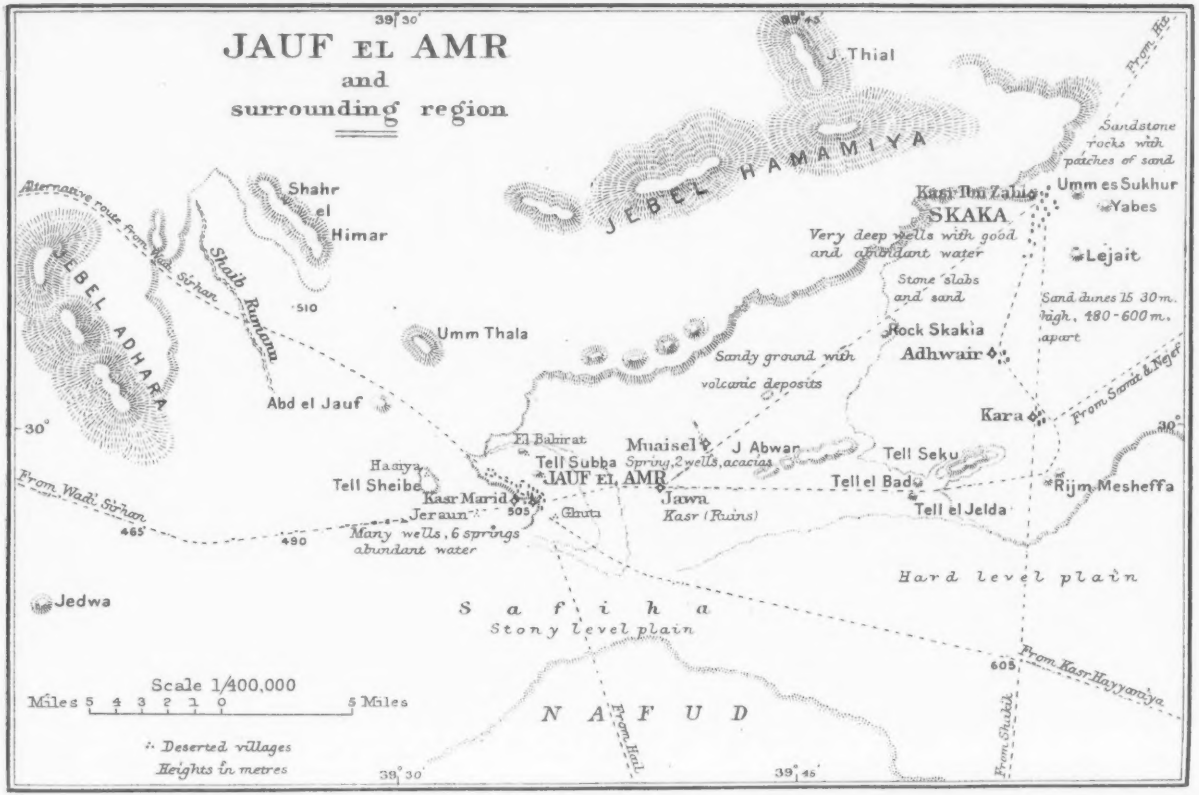
BURAIDA: "A DREAM-LIKE SPECTACLE!—A GREAT CLAY TOWN . . . BESIDE A BLUISH DARK WOOD OF ETHEL TREES . . . AS IT WERE JERUSALEM IN THE DESERT!" (DOUGHTY)

BURAIDA (LOOKING NORTH)

unoccupied, and the well "said to be 66 fathoms deep," which the Kasr protected, had been filled in by Abdul Aziz ibn Metaab er Rashid, in order to defeat Ruweilah raiding parties. Shakespear watered 17 miles on, at Hazam el Mai, "two rock pools, holding rain-water, marked by *rijms*," and passed on towards Jauf. To the north stretched the Hajara steppe, draining to the Euphrates by way of the Wadi el Khar and the Wadian; to the south rose the wall-like edge of the Great Nafud, over 30,000 square miles of continuous deep sand. Five featureless marches led the party onwards to the edge of an escarpment, whence Shakespear looked down into the curious self-contained depression which holds the northernmost of Arabian oases. "A very flat plain extending to the edge of the basin, the descent being in four successive ledges," and he arrived at "Jauf el Amr, not Amir, as the maps have it, for it was Omar, the second Caliph, who opened the heathens' eyes and made Jauf a town." * Shakespear was now on comparatively well-known ground. All travellers who have approached Arabia from the direction of Syria or Palestine, from Seetzen's emissary in 1808 onwards, have passed through Jauf. At the time of Shakespear's visit Jauf was no longer an appanage of the Shammar princes, having been wrested from them, in 1910, by the powerful Ruweilah (Anaza) chieftain, Nuri es Shalan. It has become essentially a Bedawi centre, and perhaps is better as such, for Jauf is the most isolated of all Arabian oases, cut off as it is from all other inhabited places by wide and waterless regions, Teima being the nearest at 150 miles. It is placed in mid-desert halfway between Akaba and Baghdad, between Jebel Druz and Jebel Shammar, and forms a typically nomad's centre in that vast and howling wilderness over which the great Anaza federation roams. It was the young son of Nuri es Shalan who entertained Shakespear—"a splendid little chap of ten years old, not at all shy, who took special charge of me, and chatted away without a pause." Aamar, Nuri's (semi-negro) deputy, handed Shakespear on to Huweitat *rafiks*, who bargained for £10 for safe escort to Akaba. Had Shakespear got there for that sum, he would have been lucky. He had yet 300 miles to pass the Sinai frontier, his difficulties were increasing, and he now had to deal with quite shameless robbers. His *rafiks* came the following day and "cried off"; then, being forced to keep to their bargain by the Sheikhs, they would only guarantee to safeguard him from one section of their tribe! An incident like this proves that the bad name of the Huweitat is not mere libel, for they have a reputation for treachery, and for dishonouring the time-honoured custom of *rafik*. So Shakespear was forced to go to Sheikh

Shakespear also found Hubara Bustard eggs on April 11, and he caught and bottled the venomous Horned Viper, *Umm Jeneyb*, and another called *Zarag* (this is described by Huber as *Zerrâq*, a common harmless variety, attaining a length of 4-5 feet).

* Shakespear does not add much to our knowledge of the Jauf oases, although his panoramic photos help us to get a good idea of the topography of the basin. The present population he puts at 1500.


JAUF EL AMR
and
surrounding region
39° 30'
39° 45'
J. Thial
From Hail
Sandstone rocks with patches of sand
JEBEL HAMAMIYA
Alternative route from Wadi Sirhan
Shahr el Himar
Shaib Rumiana
JEBEL ADHARA
510
Umm Thala
Kasr Ibn Zaliq
SKAKA
Umm es Sukhur
Yabes
Very deep wells with good and abundant water
Lejait
Stone slabs and sand
Sand dunes 15-30 m. high, 180-600 m. apart
Rock Skakia
Adhwair
Sandy ground with volcanic deposits
Abd el Jauf
30°
Kara
From Sirmal & Nejer
El Bahirat
Muaisel
Spring, 2 wells, acacias
J Abwan
Tell Seku
Hamiya
Tell Subba
JAUF EL AMR
Tell Sheibe
Kasr Marid
Jeraun
505
Ghuta
Jawa
Kasr (Ruins)
Tell el Badu
Rijm Mesheffa
From Wadi Sirhan
465
490
Many wells, 6 springs abundant water
Tell el Jelda
Hard level plain
Jedwa
S a f i h a
Stony level plain
605
From Kasr Hayyaviya
Scale 1/400,000
Miles 5 4 3 2 1 0 5 Miles
N A F U D
From Hail
From Shakik
Deserted villages
Heights in metres
39° 30'
39° 45'

Audah, of the Abu Tayy clan,* and found to his cost that the chieftain was no better than his henchmen. For, after a long and tedious journey, which led him northwards instead of westwards from Jauf, he fell into the hands of a Sheikh (Audah was a great character, and a famous desert raider; he made good use of himself in the War; he took Akaba with Lawrence, and followed Faisal through to Damascus. Lawrence says, "He is the best man in Arabia to have beside you in a fight; . . . when he dies the Middle Ages of the desert will have ended"), who immediately set to work to screw the last farthing he possibly could out of the Englishman. Shakespear was at the limit of his resources. He had no special present left to offer to Audah, so he put forward "a douceur of £10, and the promise of anything he liked to be sent from Egypt." This was considered an insult! In the end Shakespear had to hand over £20, which left him with £7 to carry on with. But the bond held good, and he started off westwards on May 7 in real earnest. The actual position of the Huweitat encampment was in the hill country to the north of the Wadi Sirhan, 50 miles north-west of Jauf. Once on the move, he rode fast and far. The first day he did 40 miles, crossed the Wadi Sirhan † diagonally and watered at the (10) wells of Arfaja. The famous wadi was here 18 miles across, with a sandy bottom. Arfaja was one of a group of watering-places, having Jebel Sebeikha as a landmark, which include Sheghar, Sebeikha, Meikum, and Mushash Arfaja. Leaving the wells at evening, in bright moonlight, he cleared the Sirhan depression almost immediately and came out on to the higher gravelly plain called Baseita, "flat and smooth as a pancake, and equally bare." This was the most inhospitable region he had seen in all desert Arabia. It was "a smooth black basalt expanse, without a vestige of growth." ‡ He crossed it in fourteen hours, § noting in passing the lower courses of the Wadi Fajr and its tributaries the Tarais and Thanayya. Failing to find water at Khabra Atik, he was more successful at Khabra Musawil, where he filled all available skins; this well, curiously enough, had been discovered that same year by a compatriot, Miss Gertrude Bell, while on her way to Jebel Shammar

* Abu Tayy and Beni Jazi, the two principal groups, though at feud, of Huweitat.

† The Sirhan depression is the principal physical feature of the Southern Hammad, being a self-contained basin with a drainage area of at least 35,000 square miles, extending from Jebel Druz and Jebel Anaza in the north to within 40 miles of Tebuk in the south. The actual depression is a well-defined hollow, 200 miles long and roughly 15 miles broad, with water at no great depth, hence its numerous wells, and its qualification for being the high-road between Syria and the heart of the Arabian peninsula.

‡ Baseita, "the outstretched" (see Wallin's narrative, *Geog. Jour.*, vol. 24, 1854, pp. 136, 137; also Huber's 'Journal,' p. 564). Although usually utterly sterile, Baseita does produce at certain seasons after rain a veritable harvest in the *Samh*, a small glaucous plant producing a seed which the nomads collect and grind into flour, using it for bread, porridge, and to eat with dates. See Doughty, vol. 1, pp. 312, 313.

§ Shakespear records that "Baseita extends northwards to a Shaib which flows a little south of Weisit (Wadi Hedrij), and is as broad as it is long," *i.e.* 70 miles each way.

Khabra Atik marked the end of the basalt plain; this was succeeded by rolling steppe which eventually rose to rougher country, the stark serrated ridge of Jebel Tubaik showing up to the north. He was soon embroiled in the turmoil of "wild, black and red sandstone ridges, without any grazing for the camels—a forbidding country reminding me of Hormuz, only on a larger and rougher scale." Shakespear here suffered from great heat and great cold (snow lies on Tubaik in winter), bad sand-storms and the fear of being swept up by a passing ghazzu. "All this country is so desolate as to be of no use for grazing, and is only traversed by raiding parties or despatch riders." * He was already on the dangerous coasts of the desert sea, the thresholds of which are usually considered more risky than the open ocean. The Tubaik region forms a sort of debatable land, for although it is considered by the Sherrarat to be their own special *dira*, one may fall foul of raiders of the Shammar, Ruweilah, Huweitat, or Beni Atiyah and even of the Beni Sakhr from the trans-Jordan Belka. Shakespear, for the first time in Arabia, wore partial native dress, at the earnest request of his men donning Bedawin head-dress and Arab *abba*. The sight of a solitary *thelul* rider on the horizon, or even of tracks in the sand, raised a scare; the party moved fast from well to well, mostly at night, never daring to halt long or to pitch the tents. Passing along the southern flank of the Tubaik ridge, which rose like a giant cinder heap, piled into weirdly shaped pinnacles and peaks, he crossed the outgoing routes of Guarmani in 1864, and my own in 1909, which indicate the line of the short cut (though seldom used) to Teima and the Hejaz from the north.†

The Tubaik is a small, but very rough, group of sandstone and basalt hills rising to a height of about 1000 feet above the surrounding plain, or 4000 feet above sea-level.‡ The valleys are choked with sand, and there seems to be little or no grazing. On May 10 the party "ascended a terrific pass at the juncture of the rocky Tubaik and the sandy Sanam," immediately after passing which they dropped into Wadi Fiha.§ Beyond this more broken country, then smoother plains led down to the Hejaz

* The Tubaik region is not always uninhabited. In Feb.-March I found a large section of Sherrarat at the wells of Mughaira, a day's journey to the south. In summer, when the larger tribes move away to better grazings, the Sherrarat congregate around the rapidly drying rain-pools and wells in the Tubaik valleys.

† Miss Bell found a ruined site in the Tubaik, Kilwa, which she considers to have been a station on an old caravan route, now disused. Bair, to the north, was another caravanserai on the same route.

Doughty also records the stations on a route between Teima and Ma'an, passing to the west of Tubaik (vol. I, p. 297). See also Huber's 'Journal,' pp. 572, 573.

‡ I found them "a mixture of sandstone, weather-worn black, and of lava-capped sandstone piles, often having the appearance of flat-topped table-mountains. Some of these were coal-black, and looked like immense cinder heaps; while others were of red sandstone, with only the lava-cap showing black at the top." See *Geog. Jour.*, March, 1910, p. 236.

§ Guarmani's Wadi Fihe.

railway. After one more scare of being caught up by a Huweitat ghazzu, Shakespear reached Umm Shaithiya, a good watering and summer headquarters of the Huweitat, while grazing their herds near Sanam. He rested here in order to let his exhausted camels graze, and to write up his notes. "For the first time in six days we dared to light lanterns at night." Then starting again by moonlight, Shakespear crossed the old Haj route and the modern Hejaz railway—"a mile width of innumerable tracks running north and south." He crossed the railway just to the south of Mudawara, two years later the scene of many of Lawrence's exploits. The country was still unknown; in spite of the ribbon of survey which is the railway, both to the east and west of it Shakespear had not been preceded; his route continues as *new* right across to his very last bivouac in the peninsula.

A few marches along the now disused Egyptian Pilgrim route, which joins the Syrian Haj route at Mudawara, brought him to rougher country —"the hills were magnificent battlemented walls," the wadis were deep-cut gorges, and the scenery was on a grander scale than anything he had seen in mid-Arabia. He had, of course, reached the lip of the Arabian plateau, and was about to drop into the deep rift valley of the Dead Sea and Akaba. Watering at Ain el Iram (Rum), a cleft in the rocks, he found that he had yet to run the gauntlet of Turkish territory (the Ma'an-Akaba track and telegraph) before making safe his entrance into a British sphere of influence. "Sentries were posted on the road at night, and the guide knew of no other road. After a council of war, we decided to leave for a spot somewhere three hours or more north of Akaba, camp in a ravine, if possible, and spend a day searching for a way through." Moving on they picked up a young Arab, who was tempted by the offer of a good reward to show them a road. But this entailed an act of deception which is most dangerous to practise in the desert; Shakespear had to pose as a member of that exclusive brotherhood the *Ageyl;* however, his men made him up as a *sick* one—"I had a fearfully hot time with my head bandaged up in two *khafiyahs* and the *abba*. Had to grab my breakfast as best I could lying prone sick under my native cloak; and did not come off very well." May 15 and 16 were "the worst days on record. Loaded up at 2.30 p.m. and dashed across Wadi Ithm, with its single telegraph wire. Then climbed up and up the other side until at sunset we reached the Nakb el Murghan, something over 4000 feet by my aneroid. We got a view of the sea to the south, through a cleft in the rocks, and saw smoke or haze over Akaba. Then dismounting we had to get down a fearful place. The descent went on precipitously for another hour, but at dusk luckily the going became better. My shoes had given out, and the men were all very done up, when we halted at 9 p.m., the first pause since the pass. Then Abdul Aziz came to say that they wanted to go on all night, in order to clear Wadi Musa (Araba) before daylight, that two camels were

badly lame, and that if we stayed where we were discovery would be certain. The only course left us was to "cast" part of the loads and to trust to luck. We left behind all we could dispense with, redistributed the loads, and stumbled on into the night. The rest was a nightmare of confusion, of tumble and scramble, of bruised feet, and of falling about for want of sleep, until we got down into the Wadi Araba just as the moon rose behind us over the hills which we had been clambering down for the last five hours." After getting across the Araba depression (here 12 miles wide) they experienced the same difficulty in the hills opposite; the guide came to the end of his knowledge and was sent back. But eventually they struck a well-marked track which was supposed to be the Ma'an–Kuntilla route; then they camped after "completing over twenty hours on end, with only two halts." The next morning "a search with the glasses revealed three white objects like buildings to the north; we bore down on them, and found them to be the police post of Kuntilla."

Shakespear passed on to Suez, Port Said, and Europe a contented man, having achieved his ambition, and having added his jot (no small one) to the sum-total of human knowledge.

GEOLOGICAL RESULTS OF THE MOUNT EVEREST EXPEDITION, 1921

A. M. Heron, D.Sc., F.G.S., Geological Survey of India

Read at the Afternoon Meeting of the Society, 10 *April* 1922. *Map follows p.* 480.

THE area geologically examined consists of over 8000 square miles, included within a rectangle some 120 miles from east to west and 70 miles from north to south. This corresponds with the Tibetan portion of the drainage area of the Arun river, a complicated system of valleys which unite to form the Arun before it breaks through the main Himalayan range in the impressive gorge below Kharta. The headwaters of the Rongshar Chu and the Bhutia Kosi (Pö Chu) above Nyenyam were also examined.

The southern watershed is the line of great snowy peaks running from the Khombu pass south-eastwards through Everest and Makalu to the Arun, and to the east of the Arun is the continuation of the range which divides Sikkim from Tibet; a range which lies considerably to the north of the great Kangchenjunga group of peaks.

The northern watershed is the extension of what has been termed the Ladak or northern range of the Central Himalaya; there this is hardly a definite range but rather a broad belt of high and much-dissected country, with a few peaks of over 20,000 feet distributed without linear arrange-

ment. To the north of this watershed short tributaries drain to the Brahmaputra (Tsangpo).

I am greatly indebted to the promoters of the Expedition for the privilege of accompanying it, and in particular to Colonel C. K. Howard-Bury, D.S.O., the leader, for much assistance and practical interest in my work, which is virtually a continuation, to the westward, of Sir Henry Hayden's pioneer investigations during the Tibet Expedition of 1903–4. With the exception of Sir Henry Hayden no geologist had visited this part of Tibet.

The geological mapping was done on a scale of $\frac{1}{4}$ inch to 1 mile, on skeleton maps furnished by the topographical surveyors as their plane-tabling proceeded. My very cordial thanks are due to Major H. T. Morshead, R.E., D.S.O., in charge of the Survey of India detachment, for many such facilities given and for valuable information, accompanied by specimens, from localities which I could not visit. Over a oonsiderable portion of the area, however, my work had to proceed in advance of the surveys; geological boundaries in such cases were drawn on the maps subsequently from memory, supplemented by sketch-maps and notes. It was not considered advisable to arouse the suspicions of the Tibetans by too close and prolonged examination of any particular area, and the general conditions of the Expedition's movements were unfavourable to detailed work, so I endeavoured to traverse as large an area of Tibet as possible, and to lay down on the map with fair accuracy the boundaries of the different formations where they were accessible. A considerable amount of interpolation was however, necessary, and my work must be considered as a reconnaissance and nothing more.

If I have the good fortune to accompany the second expedition I hope to examine more carefully the crystalline area in the neighbourhood of Mount Everest, with the assistance of Major Wheeler's map, constructed from photographic surveys on a scale of 1 inch to 1 mile, and to cast some light on such problems as the origin and constitution of the banded biotite gneiss and its relationships with the metamorphosed sedimentaries. The quarter-inch map was on too small a scale to be of use in the mapping of a crystalline complex.

Geologically the area is divided into two divisions: Tibetan and sedimentary to the north, and Himalayan and crystalline to the south. This distinction is clearly displayed in the topography resulting from the underlying geological structure, for to the north we have the somewhat tame rounded and lumpy mountain ranges of Tibet, with their broad and flat-bottomed valleys, contrasting with the higher, steeper, and more rugged Himalayas on the south.

The Expedition found nothing of economic interest. Stones showing the green staining of copper compounds were now and again seen on moraines, but beyond that I saw no signs of mineralization. A few clear fragments of pink tourmaline and garnet were picked up by the coolies,

but none were sufficiently free from flaws to be worth cutting. I panned the gravels in several places for gold, but without getting a colour.

The River Systems.

The two main branches of the Arun river, the Bhong Chu (or Men Chu, as it is called in its upper portion) and the Yaru Chu (Ko Chu) flow from the west and the east respectively, in a general east-and-west direction, uniting near the village of Lashar and then flowing south-westwards and southwards through the main Himalayan range. The Yara Chu rises in the hills to the north of Kampa Dzong and meanders through the broad plain which here lies at the northern foot of the snowy range, until at Sar it meets a high spur of crystalline rocks projecting northwards. This deflects it in a great sweep to the north-east and it finally cuts through the toe of this spur in the Rongme gorge instead of flowing round its end.

The Men Chu rises on the northern slopes of Gosainthan, above the Pekhü Tang, a great plain which contains a basin of enclosed drainage, the Pekhü Tso. On leaving the plain it finds its way along a valley excavated in a syncline of Cretaceous limestones, leaves that and cuts across the intervening Jurassic shales in a fine gorge to another parallel limestone syncline, and after some 16 miles along it is deflected back again to the original syncline by a north-south barrier of pegmatite veins and hard slates. Along this it then flows as the Bhong Chu for between 50 and 60 miles to near its junction with the Yaru. Two of its more important northern tributaries, the Shi Chu and the Lo Chu, also have their courses largely determined by the presence of softer bands of Cretaceous limestones. Parallel to the Bhong Chu and joining the Arun 20 miles below the confluence at Lashar is the Dzakar Chu, which, with its tributaries the Ding Chu and the Neo Chu, drains the mountainous district of Pharuk. In these also the synclinal origin of the valleys is distinct. The main drainage lines are therefore parallel to and dependent on the folding to which the region has been subjected; the general strike of the folds is W.N.W.–E.S.E.

At approximately right angles to the longitudinal drainage system are a number of transverse tributaries. Those from the northern slopes of the Great Himalaya are turbulent glacial torrents, with straighter courses and greater discharge than those from the Ladak range. Of the latter the more important occupy valleys intervening between tracts of high land which owe their prominence to their being composed of hardened and partly metamorphosed shales with clusters of intrusive granite veins. Except for glacial tarns held up by moraine dams, the Arun region is devoid of lakes; at either end, however, are basins of enclosed drainage, that of the Tsometretung to the east, and to the west that containing the Pekhü Tso, the Kharru Ochen Tso, and the Khumen Tso. All these are very shallow and vary greatly in extent according to the season of the year. In the broader valleys are extensive swamps

ENTRANCE TO THE YÖ RI GORGE OF THE ARUN RIVER

Phot. A. F. R. Wollaston.

EXIT OF THE ARUN FROM THE YÖ RI GORGE

and tracts temporarily flooded during the rains, and the so-called lakes are in fact little more.

Changes in drainage lines.

There is little doubt that the Arun has cut back through the Great Himalaya range and has captured a river which possibly flowed east from the vicinity of Gosainthan more or less along the present courses of the Men Chu and the Bhong Chu and then through the Jikkyop gap and over the plain to the south of Kampa Dzong; this river may even, as Hayden (*Mem. Geol. Surv. Ind.*, 36, pt. 2, p. 8) suggests, have flowed northward to join the Tsangpo, perhaps on the line of the Nyang Chu, the river which passes Gyantse and Shigatse. The Dzakar Chu, now also captured by the Arun, probably joined the above conjectural river flowing north-eastwards on a course approximately from the Küyok La, above Lungme, along the present valley of the Arun between Kharkhung and Lashar.

The Arun has two gorges. The lower, in which the river falls 3000 feet in the 18 miles, measured in a straight line, between Kharta and Kyimateng, is fairly straight, with walls rising 5000 feet and more in uninterrupted slopes so steep as to prevent human passage but allowing bushes and trees precarious roothold. The upper gorge is an extraordinary one, and so far I am unable to give an explanation of its origin. Where it enters the gorge the river is flowing through a fairly open valley with immense terraces of boulders and gravel, in the direction of the Küyok La, a low pass over comparatively soft schists. Abruptly the river turns upon itself and then plunges at a right angle into the heart of a high mountain (Yö Ri) of hard gneiss, in a gloomy cañon with almost vertical walls. Through this gorge the river flows south for 3 miles, then swings again and flows west for 4 miles, finally emerging from the gorge on the other side of the Küyok La, into an open valley, which has exactly the same line and character as the original valley. Thus it cuts along two sides of a triangle in hard gneiss, in preference to along the hypotenuse in soft schists. The Rongme gorge on the Yaru Chu is somewhat similar, as the stream now cuts through the end of a northward-trending spur of gneiss and adjacent hard phyllites. It seems probable from the configuration of the country that the Yaru once flowed through the Jikkyop gap 4 miles to the north, the present course of the Chiblung Chu, and has been captured by a tributary from the east.

I was able this year to devote only an occasional day or two to the vicinity of glaciers, but it is hoped that next year, with the advantage of a large-scale map on which glaciers will be shown with particular accuracy, I may be able to carry on glacial observations concurrently with the investigation of the crystalline area, to which

they are confined. I am able to add my testimony to that of Hooker, Blanford, Hayden, Garwood, and others, as to the former much greater extension of glaciation. The present glaciers are but puny representatives of their former selves, as shown by the huge moraines which encumber all the northern valleys. Two at least of the main glaciers of Makalu, flowing to the Kama valley, show evidences of recent advance.

The Himalayan Zone.

The Himalayan and crystalline zone is essentially composed of a foliated and banded biotite gneiss, usually garnetiferous, intimately injected with dykes and sills of all sizes of a schorl-muscovite granite or pegmatite. The latter is often present to such an extent that it is the predominant rock. Forming an intermediate zone between the gneiss and the Tibetan sedimentaries is a band of metamorphic rocks, altered representatives of the latter: these are also penetrated by the schorl-granite in great profusion. They appear to lie upon the gneiss, which which is probably intrusive in them; but this point is one which I hope to settle definitely if I accompany the second expedition. Other questions which arise are, to what extent the gneiss represents very highly metamorphosed sedimentaries, and to what extent it is an injection gneiss formed by the intrusion and rolling out of granite veins along the foliation of mica-schists.

Although much the same in mineral constituents, the biotite gneiss varies so greatly in proportion, in structure, and in texture that it is difficult to believe that it all has the same origin. Much of it is undoubtedly derived from granite, as, for example, the porphyritic "augen gneiss" type, and a less common variety, found in large amount near Kharta, showing thin and rather sparse foliæ of biotite with abundant felspar, forms lenticles twisted and contorted. In the Kharta and Dzakar valleys the gneiss resembles that around Darjeeling, in which dark and light bands, biotitic and felspathic respectively, alternate, and form a rock which from a little distance has the appearance of a bedded sedimentary series. As near Darjeeling, the planes of foliation or banding have usually low dips, and this variety is notably garnetiferous. Low down in some of the valleys towards the Nepal frontier, as for instance below Nyenyam and Tazang, and also probably near Kyimatang, large bodies of mica-schist are found, analogous to the schist occurring in the bottom of the Teesta valley near Darjeeling and in other localities found underlying the gneiss of Sikkim.* The latter have been mapped by Bose as the Daling Series; it is however quite uncertain whether the schist near the Nepal frontier is an altered sedimentary series or is a modification of the gneiss.

* Garwood, in Freshfield's 'Round Kangchenjunga,' p. 275; Mallet, *Mem. Geol. Surv. India*, **11**, pt. 1; Bose, *Rec. Geol. Surv. India*, **24**, pt. 1, p. 46; pt. 2, p. 217.

The schorl granite varies in texture from a fine homogeneous granite to a coarse porphyritic pegmatite, sometimes with graphic intergrowths of quartz and felspar. It is the latest in age of the igneous rocks, and occurs practically everywhere in the crystalline area, penetrating both gneiss and metamorphics in veins and sills of all sizes. The sill habit is especially characteristic, concordant with the foliation of the rocks intruded. Intrusion has taken place to such an extent that schorl granite is often seen to be the predominating rock, and not only so, but its toughness and lack of joints and foliation cause it to resist weathering and abrasion in moraines and streams, so that it nearly always is the main constituent of detrital accumulations. It has as accessory minerals quartz, plagioclase, black tourmaline (schorl) and muscovite, garnet, yellow and pink tourmaline, and beryl.

The metamorphics comprise a considerable variety of rocks, all of which, except certain quartzites, are distinctly banded or foliated in layers of differing mineral composition, with directions determined by the original stratification. As I proceeded on tour shortly after the return of the Expedition I have not had an opportunity of examining fully microscopic sections of these rocks. They range from quartzites and micaceous quartzites to mica-schists and tourmaline mica-schists, representing the arenaceous and argillaceous sedimentaries, with crystalline marbles and actinolite, tremolite, and epidote schists from the calcareous rocks.

Graphitic schists have also been noted, but are rare. They are dislocated by profuse intrusion of vein granite, and their planes of foliation lie as a rule at comparatively low angles; this is striking in the field, especially in comparison with the intense crumpling which the same rocks have undergone in the Tibetan Zone. As one ascends any of the headwaters of the Dzakar Chu towards the Mount Everest group, one leaves the twisted and crumpled Jurassic shales and passes downwards in the section, as the general dip is northwards, though actually rising in elevation to the gently rolling limestones underlying them, which flatten out as they become more altered and the snowy range is neared. In the Rongbuk valley, for instance, above the Chöbu monastery, are limestones much fissured and veined with crystalline calcite, underlain by a thick sill of schorl granite and pervaded by innumerable smaller sills and streaks. Some 60 feet of the limestone immediately above the main sill has been converted into amphibole schist, and below the sill is a band of mica-schists thickly streaked and knotted with granite in lit-par-lit injection, to such an extent that the result has a very strong resemblance to the banded variety of the biotite gneiss. In the gorge of the Dzakar Chu between Kal and Tsa is exposed a great thickness of flaggy limestones with clayey partings. At the base of the section there are great masses of schorl granite with amphibole and epidote calc-schists; upwards

the former become more definitely sill-like, insetbedded with calc-schists and finely crystalline and mottled limestones. The limestones remain crystalline for a considerable distance above the horizon of the topmost sill, and then pass upwards into black limestones, non-crystalline and calcite veined, finally succeeded by Jurassic shales and quartzites. In the valleys above Raphu and Chödzong alteration takes place independent of granite intrusions, calcite-veined, knotted and brecciated limestones passing downwards into tremolite, actinolite, and epidote schists. In the above described sections the change from sedimentary to metamorphic rock is very clearly seen, taking place gradually in magnificent cliff-faces with no break nor discordance in the stratification; from a short distance away it is indeed often impossible to say whether one is looking at limestone or calc-schist.

Speaking generally, the valleys to the north-west and north of Everest, *i.e.* valleys above about 15,000 feet, are excavated in metamorphic rocks, whereas those to the north-east and east, for the most part below about 15,000 feet, are in gneiss. It was impossible, in the time at my disposal and with a small-scale skeleton map, to attempt to lay down a boundary between metamorphics and gneiss, but it would appear possible that the metamorphics form a gently northward dipping sheet underlain by the gneiss. The gneiss is probably intrusive in the metamorphics, judging from evidences of its age elsewhere in the Himalayas, and it may be possible to ascertain this definitely if I am allowed to accompany the second expedition.

The group of high peaks between the Nangba La and the Rongbuk glacier and the north-western side of Everest itself up to the summit are of metamorphics, with of course much schorl granite, to the resistant power of which, and not the easily eroded metamorphics, is due the eminence of these peaks. When I visited the Kharta and Kama valleys on the east side of Everest before the end of the monsoon, the mountain was too much covered with fresh snow to show any geological structure. The base of Chomo Lönzo in the Kama valley is gneiss, but Col. Howard-Bury states that its upper portion is pale granite.

Amphibolites.

In the neighbourhood of Dak, in the Arun valley, numerous fragments of amphibolites, both foliated and granitoid, were observed, but the parent mass was not found. Their nature is therefore uncertain, but they are probably altered igneous rocks of intermediate or basic composition.

The Tibetan Zone.

The Tibetan Zone consists in the main of a great thickness of intensely folded Jurassic shales, the folds in general striking east and west, and repeated many times in complicated fashion. Pinched up in these, in several very elongated and narrow synclines, are limestones belonging to the Kampa System of Hayden, of Cretaceous and Eocene

age. These synclines are closely compressed and overfolded, their axial planes dipping to the north, showing that the compressive force which produced them acted from the north.

Along the southern border of the Tibetan Zone, below the base of the Jurassic shales, is a great thickness of flaggy limestones, in which the fossils have been destroyed and the rocks themselves converted in part into crystalline limestones and calc-schists. The age of these cannot be determined with certainty, but their character and position in the sequence indicate that they are possibly Trias or Permian.

I am much indebted to my colleague, Mr. G. H. Tipper, for identifying for me the small collection of fossils which I made. From a palæontologist's standpoint the country which I covered was very disappointing. The Jurassic shales are almost unfossiliferous, and yielded only a few ammonites, belemnites, and crinoid stems of little interest. The thick limestones bordering the crystalline zone show, near their top, abundant signs of organisms in the form of curved layers of crystalline calcite, which in all probability are the remains of large lamellibranchs or brachiopods, but several days' search in favourable localities failed to discover a single specimen of which one could say anything more definite. This is particularly unfortunate in view of the interest attaching to these rocks and their age.

The Eocene and Cretaceous limestones, the zones of which have been worked out in great detail by Sir Henry Hayden in the magnificent and less disturbed sections of the Kampa ridge, here occur in much compressed synclines, in which fossils have been destroyed or damaged by the shearing which they have undergone, and in which zones are almost impossible to work out owing to faulting and interruption by stretches of alluvium. It is only in the Tsipri ridge that a satisfactory detailed study of the Eocene and Cretaceous rocks can be made, and this I was unable to give time for, as when I passed it I had been separated from the Expedition by floods and had exhausted all my money and nearly all my food. It is, however, unlikely that I could have added anything of value to Sir Henry Hayden's description of these rocks.

The Kampa System.

The Kampa System is developed in two main synclines, the northern of which may be called the Tsipri syncline, from the picturesque and sacred ridge on it, and the southern the Bhong Chu, from the chief river of this area, which has excavated its valley along it; there are besides a number of small synclines. The Eocene beds above the "ferruginous sandstone" of Hayden (*Mem. Geol. Surv. India*, 36, Pt. 2, pp. 44, 48–51) are found only in the northern syncline.

In the exposures between the Yao La and Gutso this is a massive pink and white quartzite, about 100–150 feet thick, weathering into large blocks. In its degree of metamorphism it is a typical Pre-Cambrian

quartzite, although the brown shales below it and the blackish grits above are almost unaltered; the latter contain fossil wood, dicotyledonous, and is the highest formation present in the section. The Tsipri ridge gives the only fair sections of the combined Eocene and Tertiary of the Kampa System.

I was unable to examine in detail, but the general section is as below:

Bold scarp: Massive thick-bedded grey limestones, with abundant Alveolina and Operculina, alternating with massive, white, very fine-grained and unfossiliferous limestones and thin-bedded limestones.

Minor scarp: A series of limestone in regular beds of medium thickness; about the middle of this series comes the "ferruginous sandstone."

Undercliff of above: Grey flaggy limestones.

Lower scarp rising from plain: Brown argillaceous limestones, in thin regular beds.

Usually covered, but exposed at east end of ridge: Great thickness of grey unfossiliferous calcareous shales.

East end of ridge: Black and brown splintery shales with large septarian nodules.

North side of Shi Chu Valley: Grey limestone, massive quartzite, the "wall" quartzite.

The upper limestones on the south side of the ridge are corrugated, and as they pass to the northern side dip steeply up to the vertical; further north, on the northern side of the Shi Chu valley, the limestones and quartzite at the base of the syncline are inverted, with the Jurassic shales overlying them and dipping to north at 30° to 80°. The Shekar hill shows a subordinate anticline formed to the north of the main syncline. At the western end the topmost limestones come down to plain-level by a downward pitching of the syncline, and are seen in the short ridge to the west of Temi with undulating dips and a great overfold.

In the Tsipri ridge the ferruginous sandstone is not so highly indurated in the Yeo La sections; it has abundant spherical concretions of iron oxide and is in certain layers finely conglomeratic, the little pebbles, of the size of buckshot, consisting of transparent quartz, quartzite of various colours, and white chert.

At the western end of the northern syncline, where it emerges from the alluvium of the Pekhu plain, the Cretaceous limestones in their upper portion have numerous intercalated thin bands of sandstone and are themselves distinctly arenaceous, indicating, with the occurrence of fossil wood in the Eocene grits above the ferruginous sandstone, the prevalence of shallower water conditions than obtain as one passes to the east.

The structure is that of a recumbent isocline, of which both limbs dip north at 20° to 40°, affected however by minor rollings and corrugations, and the northern margin is considerably altered by metamorphic agencies connected with the granite intrusions of the Northern Range.

Locally the prominent sandstone quartzite band which is found elsewhere in the shales a little distance below the base of the limestones is wanting. This I call the "wall" quartzite. Here there is a passage into the Jurassic shales through shaly limestones. Just below these passage beds, at Menkhap Me and on the Lungchen La, fragments of ammonites of Upper Jurassic type, but not determinable with certainty, were found.

East of Gutse and Menkhap Me a broad alluvium-filled river valley and a southward-trending spur of semi-metamorphic rocks and granite veins (the Burtra ridge) cut off this syncline, but there is little doubt that it is structurally continuous with that of Tsipri. This has been described above. It also is overfolded by pressure from the north.

To the east of Shekar the outcrop of the syncline narrows, through the beds becoming more vertical, and as it swings to the north-east in the valley of the Lo Chu it flattens out again to a very recumbent isocline.

A day's search in the Cretaceous beds round Shekar failed to yield a fossil; the beds appear to have been sheared to some extent, and are shattered and veined with calcite but not rendered crystalline. In the Lo Chu valley the shaly partings between the limestones are silvery from the production of sericite mica.

The Bhong Chu syncline is also overfolded, but not to quite the same extent as the last. Like it, it extends to an unknown distance through the Pekhu plain to the westward. Where first encountered, where the Men Chu flows along a valley excavated in it, a wide plateau of undulating Jurassic shales lies to its south, on which is a shallow saucer-like syncline, containing the "wall" quartzite and a trifling thickness of limestone above it. At the edge of this plateau the shales and the "wall" quartzite roll steeply over into the Men Chu valley.

On the northern bank of the stream is a fine scarp of regularly bedded limestone, in places crowded with small lamellibranchs (unidentifiable) and what appear to be casts of brachiopods in crystalline calcite. To the north of this a double fault is well seen, bringing this limestone against the "wall" quartzite and the Jurassic shales, these dipping vertically where they meet.

Between Nelung and Tinkri, where the Bhong Chu again returns into and excavates a valley along the syncline, both limbs dip northward at about 60°. From Tingri eastwards to where it disappears near Tsonga, its southern limb is fairly regular and the "wall" quartzite stands up conspicuously along the valley, dipping at angles of 45° to 80°. Its boldness and continuity along this valley led me to give to this distinctive bed the field name which I have used here. It is about 120 feet thick; next above it is a thin but massive limestone, and then 300–400 feet of shales, passing into the slabby limestones which form the bulk of the visible section.

The northern edge is not so regular; usually it is overfolded, but in places the dip is high but normal, and south of Shekar runs a strike fault,

cutting out the "wall" quartzite. South of the Tsipri ridge the two synclines approach closely, with an intervening anticline of Jurassic shales separating them. All along the Bhong Chu valley exposures of the Cretaceous limestones are much disconnected by detrital deposits, and usually occur as isolated hills of bizarre form in which the beds are seen to be intensely crumpled and sheared, and fossils are represented by streaks of calcite. At Kyishong, near where it disappears, the syncline widens out owing to a subsidiary anticline rising up along its centre.

The group of synclines to the south, in the Pharuk district, display great irregularities and complexity of structure, so much so that I found it impossible to map them in detail on a $\frac{1}{4}$-inch scale, and have had to show them in a general and diagrammatic way. That which forms the valley of the Neo Chu and passes eastwards to near Aya is very elongated and narrow; the strata in it stand vertically or lie slightly overfolded in the usual direction, with the "wall" quartzite standing up on either side of the valley. Midway along its length a strike fault repeats it, bringing in a wedge of Jurassic shales between. At its western end it is continued by another similar syncline, not quite in line with it but parallel and a short distance to one side. In the 2 miles south of this, between Namda and Tashidzom, the "wall" quartzite and the basal beds of the Cretaceous limestones are repeated again and again by sharp folds and faults of small throw. Needless to say they are veined with calcite and in places brecciated. South of this again, from Tashidzom to Kuyul, besides the major double syncline shown on the map, small sections of the Cretaceous limestones are pinched up and faulted into the Jurassic shales. In the double syncline there is no inversion, the northern lobe being shallow, saucer-like and fairly symmetrical, while in the southern the beds are undulating and almost horizontal.

The only remaining outcrop of Cretaceous rocks lies far to the north-east, a shallow syncline similar to the last, with the quartzite dipping gently inwards round the periphery and the centre occupied by horizontal and undulating sericitic limestones.

The Jurassic shales.

The most striking features, in fact the only striking features, of the Jurassic beds are the extent and the monotony of their outcrops. They consist for the most part of dark brown and black shales and argillaceous sandstones, with subordinate quartzites, representing the purer type of sandstone, and limestones which are usually darker and more argillaceous than those of the overlying Cretaceous System.

In the tract of country between the crystalline zone and the Northern Range of the Central Himalaya, the Jurassic strata are thrown into great folds and corrugated in the most fantastic fashion, and even where the general dip approaches horizontality the beds roll about irregularly.

In such highly compressed country faulting, especially thrust-faulting, must be very prevalent, but where strata are so uniform in appearance it is extremely difficult to detect. The general strike of these folds is that of the "grain" of the country, *i.e.* in an east-west or E.S.E.–W.N.W. direction, but they are subject to far more irregularities than in the more persistent synclines of the Kampa System limestones.

In the Northern Range, and also where they pass downwards into the thick limestones along the boundary of the crystallines, the shales dip less variably and at lower angles. A certain amount of injection by granite veins has taken place in the Northern Range, along with a widespread regional induration of the rocks, attaining however only a low degree of metamorphism. The intermediate belt, where the Cretaceous and Eocene limestones have been compressed into overfolded synclines and the Jurassic shales have been so intensely folded, has been a region of weakness between two more resistant blocks. The alteration of the rocks in the Northern Range extends considerably further outwards from the areas of granite intrusion than in the opposite section of the Great Himalaya, but is of less degree. Pebbles of garnetiferous mica-schist and hornblende schist (of the "feather amphibolite type") were found in gravels below the Mön La, but the parent rock was not found *in situ*, nor were such highly metamorphosed types met with elsewhere.

Igneous Rocks in the Tibetan Zone.

The intrusive granite of the Northern Range is very similar in appearance to the schorl granite of the Himalayas, but is uniformly fine-grained instead of showing the great variation in texture of the latter rock. Like it, it is a white rock and is very tough and resistant to weathering. Mineralogically it differs from the schorl granite in that it contains biotite (with muscovite as well), instead of schorl.

Near Nelung, Khakyu, and between Namda and Aya, small dykes of dark rock were seen, in the last case strung out along a line running east and west, appearing at intervals over a length of 2½ miles. The dykes individually run only 100 feet, less or more, and are up to 3 feet wide. The rock is too thoroughly decomposed for determination, but is probably basic. Judging from the crushing and dislocation which the dykes have undergone, they are probably antecedent in age to the folding of the rocks.

For the most part the shales have been hardened and have acquired the beginning of slaty structure, being knotted and breaking into prisms, or have developed in them a certain amount of secondary sericite mica and aluminous silicates such as staurolite, and have in certain cases become phyllites. Often they have a baked appearance, being whitish or red, contrasting with the black or rusty brown tints of the unaltered shales. The quartzites show no more alteration than they do amongst the unaltered strata, but then in this area the usual Jurassic sandstone quartzite, fairly free from impurities, is just as hard and vitreous as any typical Pre-Cambrian quartzite.

Permo-Trias Limestones.

Between the crystalline and the sedimentary zones is the outcrop of a thick series of limestones, of which 2000 or 3000 feet are exposed in a very uniform assemblage of rather thin beds of 1 to 3 feet in thickness, with shaly partings. The overlying shales, of which the major portion has been shown by Hayden to be Jurassic, pass down without any visible discordance into the limestones. As has been stated, the limestones as a whole are considerably altered, all fossils having been destroyed and now appearing as streaks of crystalline calcite. More than this, they have been extensively invaded by granite veins, converted into crystalline limestones and calc-schists, and involved in the crystalline complex in such fashion that to lay down a true boundary on the map is impossible. The line which I have drawn between limestones and crystallines is arbitrary, and represents generally the upper and outer limit of granite intrusions: to the south of this line there is much of the limestone in the form of calc-schists, but intimately associated with the schorl granite. The lowest portions of the limestones are thus obliterated and their relation with the biotite gneiss is obscure, but it is probable that the latter is intrusive in them. The limestones were probably continuous right along the southern margin of the Jurassic exposures, but from point to point the zone of metamorphism and granite veining has encroached on them to a varying extent, in some places affecting them throughout and transgressing upwards as far as the Jurassic shales, and in others leaving a great thickness unaltered, so that their outcrop has now the irregular breadth shown upon the map. Their general dip is northward at low angles; at Yalep on the Pö Chu and at Kal are anticlinal flexures, and south of Raphu and Hlelung dips undulate somewhat. The bifurcation of the outcrop north of Tulung is, so far as I was able to ascertain, due to the limestones emerging again to the north of the main exposures along an anticlinal axis. The structure is, however, doubtful, and may be due to faulting. My examination of this portion of the area was much hindered by repeated snowfalls and heavy mist.

The age of these rocks is very doubtful, but may be put down provisionally as Permo-Trias. Sir Henry Hayden (*Mem. Geol. Surv. Ind.*, 36, pt. 2, p. 21) has described, under the name of the Dothak Series, an assemblage of limestones and other sedimentary rocks between the Chumbi valley and Bhutan, which in his opinion may include part or all of the Trias and possibly one or more of the Palæozoic systems.

He also suggests that Triassic rocks occur along the northern slopes of the Lhonak range between Tibet and Sikkim (*Loc. cit.*, pp. 23 and 24), and fossils typical of the Productus Shales (Upper Permian) are known to have been collected from near the Kongra La, the pass which crosses the Lhonak range south of Kampa Dzong. The situation of these exposures with regard to the crystalline zone is very similar to that of the limestones in the present area.

Direct evidence of their age, though not very definite, is given by two sections in the ridges to east and west of Hlelung. At the base of the great series of shales which overlie the limestone, just as they pass downwards into the latter, is a thin ferruginous bed crowded with Spirifer and Productus, not however specifically determinable. These would indicate that the top of the limestones is about Upper Permian in age, if the section is a straightforward one, which there is no reason to doubt. The bulk of the limestones would then represent the Permian of the European scale, with perhaps a portion of the Carboniferous. Judging from field relationships and lithological characters, I had in my own mind considered these limestones as approximately equivalent to the Kioto Limestone of the Zangskar range in Spiti (Lower Jurassic and Upper Trias), which in that country underlies the Spiti shales (Upper Jurassic), but the fossil evidence puts them much lower in the geological scale, and indicates that the Trias is represented by the lower portion of the great succession of shales; it is unfortunate that the absence of recognizable fossils from the limestones themselves leaves the question so indefinite.

Before the paper the PRESIDENT said: The paper this afternoon is one by Dr. Heron, of the Geological Survey of India. He accompanied the Mount Everest Expedition last year on the reconnaissance of the mountain, and has given us the result of that reconnaissance from the geological point of view. He is very energetic, and managed to cover a great deal of country in the region of Mount Everest. Though I do not believe he actually got to the top of the mountain, he did, however, what is from a geological point of view much more interesting—he explored all the region north of Mount Everest towards the Brahmaputra, and also to the east of it. Dr. Heron, unfortunately for us, is not able to be present as he is still out in India. He was hoping to rejoin the Mount Everest Expedition this year also, but I am not sure that he has been able to do so. We are, however, fortunate in having with us Mr. Fox, who also belongs to the Geological Survey of India, and has worked for the Survey in the Himalayas.

Mr. C. S. FOX, of the Geological Survey of India, gave an account of the above paper by Dr. Heron, and added:

The remarkable parallelism between the trough of the Tsangpo and the axis of the main Himalayan range has always been taken to indicate a common origin for both, that is, crust squeeze or pressure at right angles to these features. The same forces would account for the closely corrugated and crumpled sedimentary beds, and for the great double synclinal sag of the Cretaceous and Tertiary strata. It is, however, difficult to explain the tectonics concerning the metamorphism of the sedimentary rocks at the junction of the Tibetan and Himalayan zones.

There are certain peculiarities in the valleys of the Men Chu, Bhong Chu, and Dzakar Chu which require comment. These streams occupy synclinals or structural troughs of Cretaceous strata for part of their courses. Such structural courses are as a rule uncommon. Most streams in mountainous country occupy valleys carved along anticlinal folds. It is therefore thought that these above streams began their courses along anticlinal folds, but owing

to the overfolded condition of the strata they have cut their beds down to the underlying synclinal.

There are strange deflections of these rivers which, with the location of certain gorges and also the position of the groups of high peaks, point to the presence of a regional warping of the area in a direction transverse to the folding. Alternate zones of sag and arching of the corrugated sedimentary beds, and of uplift and depression of the crystalline zone, would account for (1) the presence of basins of enclosed drainage, *i.e.* if the uplift was faster than the stream erosion; (2) the occurrences of gorges, if the rate of uplift was slower than the rate of stream erosion; and (3) the high peaks would most likely occur in the sag of the transverse warps: the rocks in such troughs would be in compression and tightly held, whereas the rocks in the arches would be weak and more easily weathered.

However, the most interesting problem of Himalayan geology is the contrast of the two areas which are separated by the granitic core of the range of snowy peaks. The Tibetan Zone comprises fossiliferous rocks including, in one section or another, the succession from Cambrian to Eocene. On the southern side of the range the sedimentary rocks are generally of pre-Cambrian age. The two areas have an entirely different history, and yet the strata of both regions have been hopelessly involved in the crystalline complex of the range. The problem of the granitic core of the main range has not been satisfactorily solved.

The questions which confront us are: What proportion of true igneous rocks occur in the crystalline complex? Are there any intrusive granitic rocks of igneous origin? Do the gneisses and schists not represent sedimentary rocks which have been altered by intense shear stresses? And are not the granitic and granitoid gneisses representatives of those same sedimentary beds which have been subjected to enormous static pressures? These are problems that await Dr. Heron on the slopes of Mount Everest.

In reply to a question by Mr. Edwards on the formation of the gorges, Mr. Fox said: The question of the formation of the gorges in this region is usually dependent on the relative rates of stream cutting or tectonic uplifting. If an area which has been slightly elevated contains a pre-existing stream, and this stream can keep its channel open by cutting its bed deeper at a faster rate than the local rise takes place, a gorge will naturally result. As for the Tsangpo or Brahmaputra coming through, there is an example in the stream of the Assam Brahmaputra, because that river did cut across the Himalaya just as the Arun has, only more successfully. The Tsangpo, or whatever its Eastern Chinese name, very likely originally flowed straight on eastwards. It has been cut off by the Assam Brahmaputra and deflected through Assam. The Arun river will probably deflect the Tsangpo through the Nepal Himalaya in the same way.

Mr. Hinks: There is one spot in particular that has always struck those of us who have been examining the photographs from the Mount Everest Expedition, where the river Arun, having apparently a possible way of going more or less through unobstructed country, suddenly drives right into a hill. Mr. Fox put on a picture of the place just now, but he did not call particular attention to it; and not every one who saw the slide on the screen recognized the extraordinary nature of that gorge. The Arun drives straight into an almost perpendicular hill by an excessively narrow gorge, very much as if a railway engineer had taken a cutting straight through. I remember that Dr. Heron mentioned this in his original report, but gave very little explanation of it, and

I do not know whether Mr. Fox has been able to read into Dr. Heron's paper what is not visible to the ordinary uninstructed person like myself, and, if so, whether he can give us any further explanation of it.

I would like to take this opportunity of asking Mr. Fox if any estimate has been formed as to the rate at which the processes of denudation go on. It will be remembered that in February we had a discussion here on photographic survey with special reference to stereographic survey, particularly of such country as we are now discussing. The point was then raised as to whether it was not highly desirable to survey as accurately as possible some of these areas in order to be able to make a firm base now for fixing the changes that may have taken place in a hundred years' time. Having in mind an arête outlining a cirque, I was wondering if Mr. Fox has, from his work in the Himalaya, formed any idea of the rate at which the edges are degrading. I am anxious to find out what sort of prospect there is of obtaining, in a reasonable time, measurable changes in the visible geology of this splendid mountain mass.

Mr. C. C. Fox: There are two gorges to which Dr. Heron particularly refers. In the Rongme gorge I think the explanation is fairly simple because the rocks dip away from the main mass of the spur. Although Dr. Heron says the stream goes through the spur, it is still following the strike of the bedding or foliation planes of the rocks, and I think the explanation of the cutting action of the stream being greater than the rate of the regional rise fully explains that case. I think Mr. Hinks refers to the gorge south-east of the Küyok La, in which there is an old stream course. An ancient river originally flowed northward into another old river tributary of the Tsangpo. The drainage is now in the opposite direction, *i.e.* south-west. The present river approaches the Küyok La, a low pass over soft rocks, suddenly changes its mind, plunges through a gorge in a hill of hard rock, runs south for about 3 miles and turns away westwards for 4 miles, coming out behind the Küyok La saddle exactly in the same old river valley, in the same direction as it had originally been making for. An explanation of the origin of this gorge is certainly very difficult. The only thing I can suggest is that, if the arrows shown on Dr. Heron's map indicate that the gneisses are foliated on a north-and-south line, this direction is parallel to the southern deflection of the river; although the river had an opportunity of cutting across the low saddle of the Küyok La, it failed to cut across the banding of the rocks. It is far more natural for a stream to turn and follow between two beds than to try and cut across them, however soft they may be. I think in this case the river had taken advantage of a junction between the bedding of the rocks, probably between a soft and a hard bed, and followed this junction. However, in breaking across further south it did cut across the rocks which it had previously avoided. Why it did so it is difficult to say until one has the reduced levels of the saddle and the neighbourhood. It is quite likely that a lake formed, and the saddle was not as high as the point which overlooks the present gorge. I should think there was lower ground here, possibly a tributary of the Arun before the Arun robbed the north-east flowing Dzakar Chu, so that when the river was deflected it broke through a lower point than the saddle. However, it is a point I can say nothing more about, because it is necessary to have particulars of the heights and details of the geological structure.

With regard to the rate of denudation of these high peaks and great ridges and the obtaining of some measurement of the geological erosion of the high peaks, I should think the time required would be very great, though there is certainly a point in favour of making such measurements. It would be necessary

to fix a datum level on some hard basic rock pretty low down and not so exposed to frost. From this point, which can be fixed by an instrument, determinations of the height of points and ridges would be made, together with photographic records. The rocks concerned are granites or granitoid gneisses, which have for many years been considered as very resistant rocks. Granites are resistant rocks, but not resistant to great or rapid changes of temperature; they are rocks which are most easily damaged by changes of temperature in a region where they would be subjected to frost and the baking action of the sun. I remember Colonel Howard-Bury in his lecture spoke of the members of the Expedition having to wear helmets because the sun was so hot, although their feet were frozen.

You have an excellent instance in Trafalgar Square of the poor resistance of granite to changes of temperature. You will remember the base of Nelson's Column is made of granite. On Armistice night people lighted fires, and you will see the scaling action on the plinth facing Whitehall and on the steps facing Cockspur Street. Granite is composed of two minerals, quartz and feldspar, which have very different rates of expansion, with the result that when these minerals are subjected to heat and cooled, or cooled and subjected to heat, the rock disintegrates, and as you have in Nelson's Column through the action of the fire, so in the Himalayan peaks I expect the erosion is very rapid indeed. Judging by the screes we saw in the views of Chomolhari and the photograph looking east over Phari, the granite rocks have been wearing away very rapidly because of the changes of temperature. Therefore, if any experiments are carried out regarding the rate of erosion, they would have to be carried out from some place or rock, particularly dark basic rock, which was not so liable to erosion. I think definite figures for the rate of erosion could be obtained.

Dr. FORBES: It is known that there are marine rocks to the north of the Tsangpo. If so, how far north do these sedimentary marine beds occur? Is it still farther north of the Tibetan area?

Mr. FOX: The highest point at which sedimentary rocks have been found in that part of the Himalaya is 20,000 feet.

Dr. FORBES: To the north of the Tsangpo are there also marine beds?

Mr. FOX: It is suspected that the Jurassic rocks go a long way further north, even to Lhasa. Fossils were found a considerable distance out. There is supposed to be an immense area of marine Jurassic beds. That is what makes the geology of the district so monotonous; you go for hundreds of square miles, and the area is full of these marine sedimentary beds.

The PRESIDENT: We are very much indebted to Mr. Fox for having taken all this trouble as regards Dr. Heron's paper. To one who has been up in these regions there is a very remarkable difference, as Mr. Fox has pointed out, between the line of the great peaks of the Himalaya—Mount Everest, Makalu, and the others further east—and the Tibetan area proper, where you get into those rounded hills and trough-like valleys. But I think the most striking point of the lecture was the expectation that the Arun would one day capture the Brahmaputra itself, and that we should have the Brahmaputra eventually coming down through that Arun gorge and joining the Ganges considerably further west than it does now. What will happen to the rest of the Tsangpo river or the Brahmaputra, one does not like to prognosticate.

I was also rather surprised to hear that Dr. Heron did regard Mount Everest itself and those lines of the great peaks as more interesting than Tibet. I thought really that the geology of the Tibetan plateau was the more interest-

ing of the two, because on the geological map you had a great broad band coloured pink, which is the line of crystalline rock, and that looked very monotonous in comparison with the beautiful blues, yellows, greens, and browns of the Tibetan marine sedimentary rocks. Apparently that area of the crystalline rocks does differ very considerably in different parts, and Dr. Heron, as Mr. Fox has said, did not go to Everest itself last year, because there was no map then of the region, and he had reserved that for this year. However, we are not quite certain whether Dr. Heron will personally go there this year; but at any rate amongst the members of the expedition there is at least one who is quite a good amateur geologist, and that is Dr. Somervell, who before he left England went particularly into the question of the geology of that region, and knew exactly what it was hoped to find out there. He will, I am sure, do his very best to bring back for geologists the information that they would like, and we also hope that he will bring back a piece of the top of Mount Everest itself.

As regards the denudation of these granite peaks, I must say the idea I had in my mind was that granite, as most people think, is a hard rock which stands weathering better than most. But I can quite bear out what Mr. Fox said, that these peaks do weather away to a most extraordinary extent. Whether Mount Everest is getting lower and lower every year, or whether there is an upward thrust which is compensating for this denudation, we have not any means at present of determining. But it is well worth following up Mr. Hinks' suggestion that as accurate observations as possible should be taken from some reliable base of the summits of these peaks and the prominent points along them, in order that we may get some idea of the rate of denudation.

I am sure you would like me to thank Mr. Fox, on your behalf, for the great trouble he has taken with this lecture, and, as I say, we hope we shall have another lecture from perhaps Dr. Heron, or at any rate some geologist with the Expedition, giving the fuller results of the examination of the Mount Everest region.

Mr. E. H. Pascoe (Director of the Geological Survey of India), sends the following note on Dr. Heron's report:

Before making any comments upon Dr. Heron's interesting paper, I should like to take this opportunity of expressing the Geological Survey's deep appreciation of the courtesy of the Mount Everest Committee in allowing one of us to accompany the Expedition. No one realizes better than we do the grim necessity of cutting down transport and commissariat requirements to a minimum in an expedition of this nature, and we can only hope that the unselfish acquiescence of the Expeditionary leaders in this respect will result in additional public interest and support.

With regard to Dr. Heron's paper, I should like to express my opinion that he has more than justified his selection for the task he has so thoroughly performed. Any one who has ever undertaken such pioneer work in such a rugged country and has had to make his efforts conform to the collective exigencies of a party, has only to look carefully into the geological map submitted, to visualize the heavy going, the arduous and often disappointing climbs, the cold nights, the sore feet, and the frequently empty inside! One might aptly parody the old proverb and say "an ounce of map is worth a pound of text." The primary achievement of Dr. Heron is undoubtedly the prosaic record of the boundary-lines between the Jurassic shales and the Crystalline complex, and similar lines delimiting the outcrops of Cretaceous and Tertiary beds and

indicating, however approximately, the extent of the interesting granite-invaded limestones presumed to be of Permian and Triassic age. We could ill spare the carefully worded remarks and conclusions, but our loss would be profoundly greater if we were deprived of the map. I am constrained to dwell emphatically on this point, as the value and importance of a geological reconnaissance are too often estimated by the number of unusual or unique features and occurrences found therein. The ultimate importance of a map like that before us can only be appreciated when it can take its place as part of a complete geological picture of Central Asia. If it had consisted of one monotonous outcrop of Jurassic shales with no boundary-lines drawn, it would still have been work of prime necessity and importance, without which our endeavour to reconstruct the history of the Earth's crust would have lacked valuable and perhaps critical facts.

The Men Chu, Bhong Chu, and a few other east-west portions of the river system occupy synclines of Cretaceous limestone. It would be unwise, I think, to classify these valleys as synclinal valleys without a word of modification. In the early stages of folding these synclines may have been structurally responsible for the valleys, but that the two features—valley and syncline—still coincide in parts of a system of tightly packed isoclines, seems attributable more to the accidental inferiority in erosion resistance of the Cretaceous beds themselves. That the latter are softer than the immediately surrounding rocks, I gather from Dr. Heron's remark that the Shi Chu and the Lo Chu "also have their courses largely determined by the presence of softer bands of Cretaceous limestones." Possibly Dr. Heron has other confirmatory grounds for speaking of the distinct synclinal origin of the Dzakar Chu, Ding Chu, Neo Chu, and other streams.

One of the most interesting series found seems to be the band of metamorphosed limestones occurring not far from Mount Everest itself, between the gneisses and the Jurassic shales, and attributed with some degree of probability to the Permian and Lower Trias, corresponding to Hayden's Dothak series. A good many points remain to be cleared up regarding their relationship to the gneiss and its intrusive granite, but Dr. Heron seems to have had good reason for his conviction that they include metamorphosed sedimentary deposits. It is to be hoped that he may this year be fortunate enough to discover identifiable fossils.

To some the most interesting find is, perhaps, that of Hayden's Kampa system, and especially of the Eocene members thereof. The occurrence of our old friend the Alveolina limestone in the Tsipri ridge illustrates the extension of marine Eocene conditions along the north of the Himalaya chain, and it will be of the greatest interest, from a structural as well as from a palæo-geographical point of view, to trace, as we shall when this part of Asia has been more completely worked over, any correspondence between the Tibetan Eocene waters and the Indian Eocene gulf which stretched from the Punjab south-eastwards along the southern foot of the Himalaya at least as far as the vicinity of Naini Tal. I am convinced that there is a close and interesting analogy between the Tsangpo valley and this old Punjab gulf, which there is good reason for believing gave place to a large north-westerly flowing river. Dr. Heron's description of the ferruginous sandstone of the Tsipri ridge, with its "spherical concretions of iron oxide," is very suggestive of the ferruginous pisolitic band so characteristic of the base of the Indian Eocene or Nummulitic series.

LURISTAN: PISH-I-KUH AND BALA GARIVEH

C. J. Edmonds, H.M. Levant Consular Service, attached Civil Administration of 'Iraq

(*Continued from p.* 356.)

IN 1917 I held the post of Political Officer, Dizful. In consequence of the disorders in the province in the preceding years the Russian Government had not been able to establish a Governor there. I therefore had an escort of about fifty Sagvand sowars, with the moral backing of a squadron of Indian cavalry at Shush, the ancient Susa, 18 miles away. There was also an Indian brigade at Ahwaz, 100 miles south.

The Sagvand sowars were supplied by the chief of the Rahim Khani section of the tribe, Sartip Khan. The Rahim Khani Sagvands are now semi-sedentary in the Arabistan plain. They are unable to go north owing to their blood-feud with the Ali Khani section of the same tribe, who are obliged for the same reason to remain in the high country near Khurramabad winter and summer alike.

The Lur makes his shortened forms of names much as we should and Sartip was always known as "Tipa." After what I have said about the character of the Lur it may sound somewhat contradictory if I say that Tipa was a most attractive person, but he is the exception that proves the rule. He was the only Lur for whom I have been able to have any respect, and for him I confess I had a real affection. Poor Tipa! In typical Lur fashion he was treacherously murdered a year or two later, while a guest in his tents, by his kinsman, Mizban Khan, chief of the Agha Rigai section who live west of the Karkheh.

Dizful is the market town for most of the tribes of Bala Gariveh in winter and spring. Even in the summer that year the Lurs were constantly coming down to Dizful to take merchandize to the plateau, for the Bushire, Bakhtiari, and Baghdad routes were closed and there were good profits to be made even after the merchant had paid the tribes heavy blackmail for escorting it through. In the absence of a Persian Governor what more natural than that these uncouth tribesmen should seek to make the acquaintance of the "Consur," as they called him, the only available representative of any Government, albeit a foreign one?

So they would come in and go to Tipa for an introduction, for did he not supply fifty sowars to the Consur and gain admission to his presence every day? And Tipa would send them to the *hammam* to have a bath and put on clean clothes, or, if they were very uncouth, send them to a tailor to get clothes of orthodox Lur cut. Then he would tell them how to behave and the sort of thing they were to say. At the appointed time he would bring them in, and each would slip off his shoes and, hand on breast, bow low in *ta'zim* till you could almost see nothing but the enormous circular crown of his high felt hat. Seated on the ground they would

protest, in their rough dialect, their desire to serve the glorious British Government whose power extended everywhere, and which, of course, never failed to reward all faithful servants.

Indeed, about this time many tribesmen who had never before dared to set foot within a town, were encouraged by the security afforded by the proximity of British troops to come into Dizful. The *Kadkhudas* of the Mirzavand section of the Dalavand on one occasion came in for the first time in their lives. It was in order to see something of these people in their homes that I visited the secluded valley of Mungarreh, described earlier in this paper.

From Dizful to Khurramabad and Burujird.

I left Dizful again on August 28, to march up to Khurramabad by the Kiyalan–Dalich road (route 3). The Luristan trade route boom was then at its height, and the right bank of the river was black with the bivouacs of parties of most of the tribes of Bala Gariveh, Dirakvand, Judaki, Papi, who had come down to Dizful with every animal they could lay hands on to profit by the high rates and blackmail that were being freely paid to get goods up country. It was therefore arranged that the caravans then forming, with important representatives of each of the tribes I was likely to encounter *en route*, should be detained in Dizful until receipt of news of my safe arrival in Khurramabad; while I was to be accompanied by Mir Hajji Khan and Mir Rustam Khan of the Mir Abbas Khani section of the Dirakvand and Abbas Khan of the Judaki, with a number of lesser lights of these two tribes.

With the assistance of Sartip Khan, cut and dried arrangements were made as to the presents to be given to the tribes concerned. This was a most delicate matter requiring much inside knowledge, for the tribes of Bala Gariveh have amongst themselves a traditional arrangement of the proportions in which all liabilities and all perquisites are to be divided, and any deviation from it is liable to cause complications and possibly bloodshed. But the first march out worries on this score began; Abbas Judaki thought that Sartip (who accompanied me the first few miles) ought to give him a mare and a rifle, Mir Hajji thought he ought to receive some special recognition as head of all the Mirs, the whole party thought I ought to supply them with barley and straw for their horses. These demands were refused.

My personal party this time consisted of Qurban Ali, my Bakhtiari syce; four Kurdish sowars; my old Dizfuli muleteer, Meshedi Riza; a venerable Indian cook, Muhammad Vali, of whose previous history I never learned anything, and who never opened his mouth except to say, "All right, sahib"; and a small Shushtari boy named Yahir, who wished to see the world and begged to be allowed to come in place of Abbud, who quite naturally was not anxious to venture himself again among a foreign and barbarous people. I never wish to be better served.

In all the seven and a half months that elapsed before we saw Dizful again, however trying the circumstances, I never heard a word of complaint, nor saw a look of dissatisfaction from any of them.

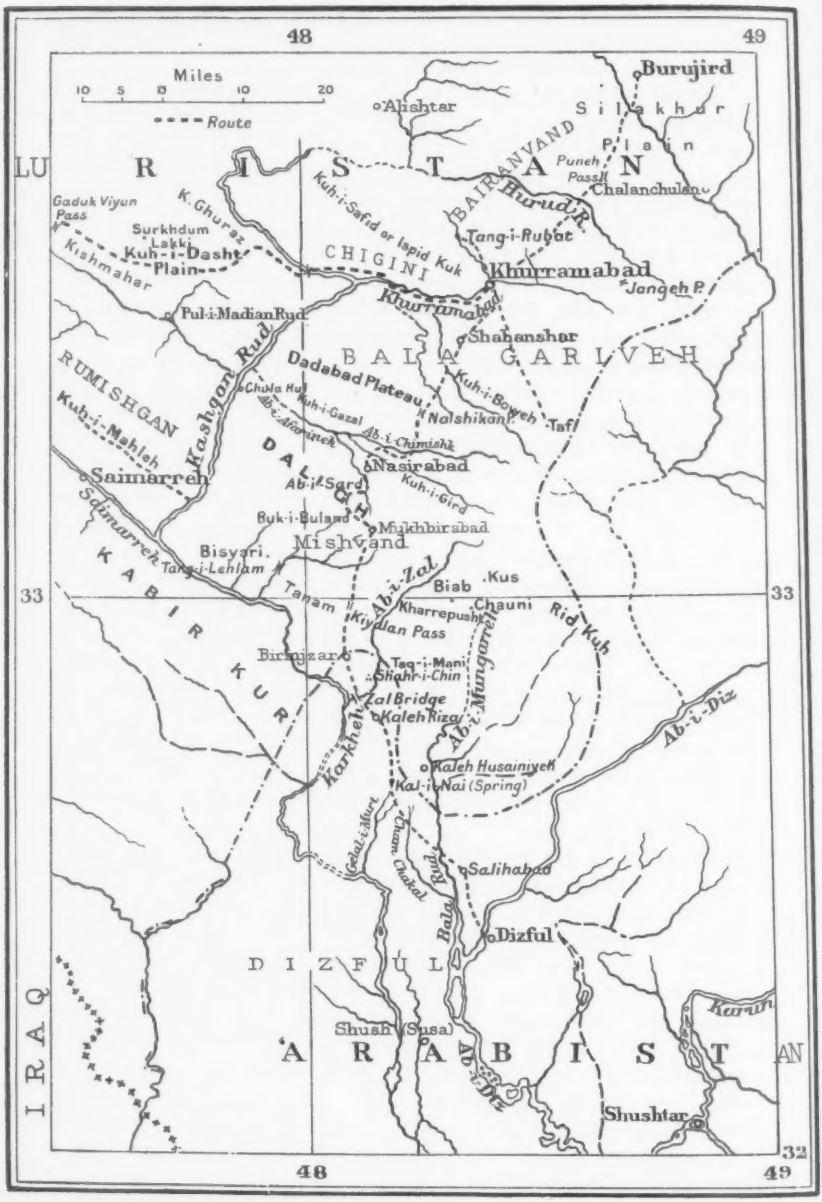
My aneroid was broken the first day. The heights given are therefore taken from other sources, mostly Schindler. I left Dizful at sunset and made my first halt, as before, at Dareb Khan's camp at Salihabad. We left again at 3.40 a.m. and crossed the Bala Rud about sunrise, when the Mirs dismounted to say their prayers. At this point we left on our right the road that goes by way of the old unfinished Bala Rud bridge, mentioned by Rawlinson, to Kaleh Husainiyeh and marched north-westwards over rising country. Hereabouts we put up a large herd of gazelle. We crossed a depression with very little water called Cham Chakal, and at 7.30 descended into the Gelal-i-Murt, the Myrtle Shingle, a deep shingly ravine with a few exiguous springs forming a small sluggish stream. The distance from Dizful is about 23 miles.

We lay up at Gelal-i-Murt for the day, and set out again at 9.45 p.m. by starlight to follow a rough path, often sufficiently declivitous and slippery to force us to dismount. It was too dark to see anything of the route we were following. We stopped once or twice at small springs, the only place worthy of mention being Kal-i-Nai, a cane-grown depression where there is a little water.

By 5 a.m. we had emerged into an open plain, and passing through a gap in a low line of hills rejoined the main road from Kaleh Husainiyeh just west of the Kaleh Riza, a ruinous caravanserai perched on a hill. Another 4 miles west-north-west over a stony road with a line of gypsum hills on our right brought us to the Zal river (43 miles), which we crossed by a one-arched bridge of brick, the path descending to which is marked by a pillar. There are ruins of several other bridges in the vicinity. I camped for the day by the water's edge 2 miles above the bridge, where the Zal runs in a clear shallow stream over a bed of snow-white boulders, with occasional deep pools.

We left at 4 a.m. and marched over an atrociously stony road up a valley called Qafileh Ja Talkhab from a brackish stream flowing through it, to an eminence called Tir-i-Dal. Here there is a pile of stones, to which each traveller adds his contribution as an act of piety to the shrine of Shah Ahmad, just visible on the slopes of the Kabir Kuh to the south-west. Three or four miles to the east, but hidden by low gypsum hills, they say there are the extensive ruins of the Shahr-i-Chin, the city of China. About this point dwarf oak begins to appear on the mountain-sides. We reached Birinjzar (which means the rice-fields) at 7.30, the 9 miles having taken about three hours' actual marching. At Birinjzar there is a stream, and by it the remains of a jerry-built telegraph house and caravanserai of the eighteen-seventies, which were immediately destroyed by the Lurs if they were ever completed.

At Birinjzar Mir Rustam and Abbas Judaki and their party asked



Sketch-map of Mr. Edmonds' journey from Dizful to Khurramabad.

permission to go off at once owing to their feud with Mir Hajji, through whose country we were about to pass, though up to this point the feud had been dropped to the extent of allowing them to sit on the same carpet when I was present. The trouble they described as "nothing much; the usual sulks between relations."

We left Birinjzar at 4 a.m. on September 1, I riding a mule, and reached the top of the Kiyalan pass (57 miles, alt. 4700 ft.) at 5.40. From here I took Mir Hajji, to climb to the top of the mountain, properly called Tanam. The climb took rather over an hour; the ascent though steep was not difficult, there being good rock foot-holds everywhere, and I found the rag soles of my Persian *givehs* gave an excellent grip on the smooth limestone. A delightfully cool breeze from the north came to emphasize that the heat of Arabistan and the filth of Dizful had been left behind. The view was magnificent. To the south the great Kabir Kuh with the Saimarreh river flowing along its northern base and then, after receiving the waters of the Zal, round its eastern extremity and through the foothills, to emerge as the Karkheh into the great expanse of the Arabistan plain. To the east my old friends of the Mungarreh region, Taq-i-Mani, Siyan Kuh, Chauni with the summit of Asfalun just showing over it, Kharrehpusht falling down to the Kurki valley, and in the further distance the rounded outline of Biab, with a great chunk bitten out of it called Dadakush. To the north a broad plain dotted with mounds of gypsum and called Takht-i-Chin and Takht-i-Nazanin, the caravanserai of Mukhbirabad just visible at the entrance to the Mishvand pass; in the background the long line of the Dalich range.

I started down with great reluctance and rejoined the caravan on the pass at 10. The descent was long and tedious, to an anything but appetizing pool called Ab-i-Zahleh. Keeping to the west of the more usual route *viâ* Sar-i-Gul, we passed the Shikaft Bu Gand, the "Cleft of the stench," and over a broad expanse of limestone clints with mounds of gypsum apparently plumped down on it anyhow. Crossing the Takht-i-Nazanin we reached the caravanserai of Mukhbirabad (67 miles, alt. 3700 feet) soon after one and camped a few hundred yards up in the Mishvand defile. The nights were now distinctly colder and I used a blanket for the first time, still sleeping of course *à la belle étoile*.

I left again at 4 a.m., riding a mule for the steep ascent and descent of Buk-i-Buland. Beyond, the Dalich pass is comparatively easy going, over limestone of blinding white. A small stream flows down it, and near the top (6000 feet) above the spring are the remains of an old watch-tower, several pomegranate trees belonging thereto and signs of former road-making. I climbed the peak between the two Dalich passes and was rewarded with an excellent view; Tanam, its peak above Kiyalan almost due south, sloping gently westward till suddenly broken by the Tang-i-Lehlam, that divides it from Bisyari; and almost due west, rising suddenly out of the plain, the truncated cone of Kuh-i-Mahleh, in Rumishgan

across the Kashgan river; behind all, like a curtain hung to set off the scene, the long line of Kabir Kuh. To the north and north-east lay the Kuh-i-Ghazal and the Kuh-i-Gird, broken by the V of the Chimishk gorge, with the Ispid Kuh of Khurramabad almost due north peeping over Ghazal.

An hour's march from the top of the pass brought us to the Ab-i-Sard spring (76 miles) in a stony valley, where Mir Hajji's section of the tribe were camped, or rather bivouacked, for they were then using neither tents nor regularly built *kulas*, but had simply set up screens round any large oak. There were two ruined caravanserais among the maize-fields.

I was to halt at Ab-i-Sard on September 3 to await Mir Rustam's escort, so visited Kaleh Nasirabad, another of those ruined caravanserais and telegraph houses that commemorate the worthy but unsuccessful attempts to establish communications through Luristan nearly fifty years ago. To the south-east the great jagged peak of Kus seemed to hang over us. The valley was green with the maize cultivation of the Judaki, and the young *khans* of the Aqa Riza family struck me as a pleasant, clean-faced lot, contrasting very favourably with the Mirs. They were well mounted and, like all the tribes of Luristan, well armed with modern rifles. Divided amongst themselves and more or less rejected by their *ryots*, who were camped away to the west at Chula Hul, the Judaki *khans* had fallen on evil days, and the two rival families had attached themselves to Mir Hajji and Mir Rustam for support.

It being summer we did not march by way of Kaleh Nasir the following day, but took a road rather to the west along the Afarineh, a fast-flowing copious brook running northwards till joined by the stream from Nasirabad, where it turns due west. We reached this point in an hour and a half. A few more ups and downs brought us to the willow-grown banks of the Ab-i-Chimishk where the Mir Rizais, an unimportant but distinct section of the Dirakvand Mirs, were camped in *kulas*.

As we neared the top of the Chimishk pass (5465 feet) Mir Hajji said he could go no further, but must find his way to Khurramabad by another route owing to the feud. A long easy descent brought us once more to the Ab-i-Chimishk, more picturesque than ever, before it cuts its way through an impassable gorge to the spot where we last saw it. Great preparations had been made for my *istiqbal*. As we emerged in the plain some sixty *sowars*, "brothers" of Mir Rustam, were drawn up, and beyond, every 100 yards or so, were more groups of horsemen and riflemen, each representing a different section. They fell in behind as we progressed, till the whole valley was alive with these high-hatted horsemen and footmen, each with three or four bandoliers round his waist and a rifle slung over his shoulder. Among them was a small boy of about eight, got up exactly like the others. A drummer, two pipers, and two dancers hopped about in front of my horse, turning somersaults and pointing sticks at each other in mimic duel. The *sowars* then asked permission to give an exhibition of their skill, and galloped off in line

firing at stones at most dangerous angles for us now behind. The Lur seems to be quite ignorant of the possibility of ricochet. So, jostling and hustling, we went up through the upper Chimishk gorge to Mir Rustam's camp (88 miles), where a *kula* had been carpeted. Snow had been brought from the neighbouring mountains to cool our drinks.

I then took a nap to get a respite from the Lurs, but no sooner was I up again than the musicians, called *lutis*, came and asked permission to perform. Carpets were spread and we sat around. The band consisted of two pipers, one big drummer, and a boy with a small long kettle-drum. The time and rhythm were more like ours than anything I had hitherto met in Persia. The dancers stand in a line and clasp hands, holding their arms stiffly by their sides so as to bring their bodies close together. The outside performers wave scarves, and the dance consists generally of slow movements from foot to foot in time to the music, though there were several figures and variations. At the end two came forward and hopped about on their haunches, pointing sticks at each other, and going through mimic movements of a duel on horseback till one fell over as if shot, much to the delight of the onlookers. The performers seemed absolutely tireless, and the performance interminable.

The Nalshikan pass hardly seemed to deserve its name of the "horse-shoe breaker." The going over the wooded Dadabad plateau, where we disturbed a herd of gazelle and some magnificent pig, was excellent. From the Kuh-i-Boweh (5900 feet) you get the first view of Khurramabad far away across the plain below.

We were met by large ceremonial reception parties of townsmen and tribesmen, with *lutis* blowing pipes, banging drums, and performing acrobatic feats. Several parties came out as far as Shahinshah, 8 or 9 miles from the town.

The town of Khurramabad lies at an altitude of 4200 feet on the last slopes of the south-eastern end of the Ispid Kuh, descending gradually to the river. It is dominated by a fort, named the Falak-al-Aflak and of early Arab construction, built on a rocky elevation at the edge of the town and enclosed within the walls of the Government House. The houses appear to be well built of brick, with tall trees, cypress, plane, and others, growing in the gardens. At the time of my visit many roofs were yellow with maize spread out to dry; owing to the insecurity the owners harvest it at the earliest possible moment, leaving the final separating and drying processes to the security of their houses. The bridge, a modern structure of brick, crosses the river at the northern end of the town, which runs thence in a crescent west of the palace grounds to the river, which it touches again with its southern end. To the north and across the river east and south are extensive gardens, beautifully green and dense with walnut, plane, and fruit trees.

The palace and its dependent buildings have fallen into a sorry state of decay. The stables, barracks, and ordnance stores are in ruins. Less

dilapidated but in a sad condition is a large court containing a square pond, the bottom overgrown with weeds. The water flows through what used to be the governor's apartment, into the rose garden, where the stream is flanked by rows of weeping willow and cypress trees. At the far end of the garden, backing on to the river, is a small house built by Ain-ud-Dauleh and renovated by the gendarmerie in 1915. It was here that I took up my abode.

The streets of Khurramabad were deep in filth and litter, but, as the domestic sewage is not discharged into the streets as at Dizful and Shushtar, it would be a simple process to keep them clean. The bazaars were well stocked. They were protected from the sun by screens of boughs built across the streets from roof to roof. There is one good caravanserai. Outside the town is the *gardab*, a large masonry tank with springs bubbling up in it. The water is said to be full of mercury and has an unpleasant fishy taste. For drinking-water one is obliged to send to the Ab-i-Karguneh, a tributary that flows into the main river just above the bridge.

Khurramabad is said to have ten thousand inhabitants (though I personally should not estimate the population at more than four thousand), including some two hundred Jews and a few non-Lur Persians, but no Armenians. There are three principal quarters: Pusht-i-Bazar, Darb-i-Dallakan, Zaid Ibn Ali. A small quarter, Baba Tahir and Chaqarvand, is attached to No. 2, while No. 3 is further subdivided into the Gardab, Valizadeh and Sadat quarters. Each quarter has its *kadkhudas* or headmen.

There are two influential families in the town, the Valizadehs, a collateral branch of the family of the present Valis of Pusht-i-Kuh, and the Chaqarvand. The relation of these families to the townsmen is much the same as that of the Khans to the ryots in the tribes—they have a certain influence but little real authority.

There is great jealousy between these two families, and each is allied with one of the tribal groups which maintain the balance of power in Pish-i-Kuh and Bala Gariveh. This rivalry began to make itself felt when I was yet several miles from the town. To avoid any appearance of favouritism I had long before announced my intention of living in the Governor's palace, which was vacant. Up to the last moment both families continued to intrigue to get me into their own houses, so as to score off the other. When I was at Shahanshah a letter arrived from the Valizadehs to say that the palace, as every one knew, was in ruins and uninhabitable. Meanwhile the Chaqarvand, realizing that the greater victory was out of the question, astutely stepped in and carpeted the house in the rose garden, and so got partial credit for acting as my host. The building was in excellent repair.

The ruins of the ancient city destroyed by Chinghiz or Tamerlane can still be seen on the left bank of the river, the only monuments calling

for notice being a twelfth-century monolith, standing, it is said, on a broad stone base now covered with earth, a minaret of remarkably solid construction which can be ascended though the stone steps are very worn and slippery, and a completely ruinous bridge. Of this bridge only eight arches now remain standing. The piers of dressed stone appear to have been built on very shallow foundations of stone and mortar, which have been completely rooted up where the arches fell over. The superstructure of stone and mortar appears to be of very poor workmanship. Local tradition states that a still more ancient city stood near the site of the modern deserted village of Tir Bazar below Shahanshah.

From Khurramabad I made several excursions, of which only two call for notice. The first was to the brine springs of Rubat, some 12 miles north-west of the town. The road follows the Khurramahad river, upstream, through the valley of Papi Khaldar, between Ispid Kuh and Siyah Kamar, also called Makhmal Kuh. It is the property of town owners. At that time Hasanvand tribesmen of the Daulatshah section were settled there and paid merely a nominal rent. They were busy harvesting the maize, and four or five oxen yoked together were treading it out. Along the side of Ispid Kuh is a conduit, called Nahr-i-Nasiri from the monarch who dug it, and now of course out of order, that carried sweet water from the neighbourhood of Rubat to the town. The road is good as far as the Rubat pass (at about 11 miles), but here blasting and clearing of jungle and road-making would be required to make it fit for wheels. The Rubat brine wells were being worked.

The second excursion was to Taf, a prominent landmark even in this mountainous country. From the town the road skirts the extremity of Mutba, where a series of springs inundates the roadway. After emerging into the open Kurrehgah plain the only natural features are a broad stony river-bed (then dry, its waters having been diverted to agricultural purposes by the Papi higher up) and a marshy watercourse which, though narrow, the horses were quite unable to cross till we followed it up to a higher level. Three hours after mounting we halted for a few minutes in the Tang-i-Bahram-Rush, where the road crosses the Taf stream and enters the hills. Our road then took us for an hour along and around precipitous hillsides and sparsely cultivated valleys till we finally emerged into a small plateau, where *lutis* escorted us to the tent of Kahkhuda Fazil of the Qalavand.

At Khurramabad, too, I found that great political significance had been attached to my visit, and I had great difficulty in persuading people that I was simply bound for Tehran. I therefore decided to move on at once, but, as is inevitable in Luristan and partly owing to the treachery of an agent who held up my letters, there was unconscionable delay, and I got away only on September 22, seventeen days after my arrival. Even then it was only managed by refusing to wait for the big Bairanvand Khans, whose presence was supposed to be essential to a safe passage.

Collecting a few *kadkhudas* with promises of presents, I came through from Deh Pir to Kaivareh (a farsakh from Burujird) in a day of 11½ hours.

The Bairanvand road to Burujird is the most direct, but is generally avoided by caravans owing to the physical obstacle of the Puneh pass and the lawless character of the Bairanvand *ryots* that infest it. Even the villages of the fertile plain of Silakhur, which is outside the limits of Luristan, have been seized and occupied by the Bairanvand for some years past. In winter the pass is blocked by snow.

The following note on the route is reproduced from my diary:

Cross Khurramabad bridge and bridge over Ab-i-Karguneh at ½ mile, then up Kemalvand valley and through pass of Zahid-i-Shir (Tan-i-Zahid) at 6 miles; route then turns north-west for short distance across Tajreh plain along hillside, and, after crossing small stream at Deli Zal Bak, curves north-east again across Takht Deh Pir to foot of Namaklun (9 miles), where there is a small spring. (September 1917, camp of Bairanvand Khans of Huz Ali Muhammad.)

Ascent of Namaklun, a part of Rumilleh range, is fairly steep, and near the top stony but not difficult for horses or pack-animals. At 10½ miles past salt "mines" which give district its name. Brine is drawn from one well and two or three springs, all very muddy. They are not systematically worked, and in quality the salt is much inferior to the Rubat product. One sweet spring.

At 13 miles enter Hurud district and commence descent. Small spring at foot called Chashmeh Sardeh. (Land is property of Sagvand Khans, who have been ousted. In September 1917 valley was dotted with tents of Zaid Ali and Baruni sections of Mal Asad tribe of Bairanvand *ryots*.) Low hills on each side of valley converge, and at 15 miles road, still running north-east, passes through Charkh Suneh defile, through which stream runs to join Hurud river. At 16 miles cross Hurud river (September 1917, water 2 feet), thence across broad level plateau of Kasiyan, and at 20 miles over low foothills into narrow well-irrigated valley of Chuqa Bak at foot of mountain.

Ascent of Puneh pass steep and difficult, but can be negotiated by caravans. Descent on far side less difficult. Road then passes through Tang-i-Dinarabad, narrow path running along hillside with stream at bottom. Isolated tents and permanent village occupied from October through winter by Bairanvand *ryots* of Shabun and Shahverdi section.

At 28 miles into Silakhur plain, and follow good road on high ground at foot of hills to Burujird (about 38 miles).

Alternative routes: (*a*) After passing through Tang Zahid turn east through Darreh Diraz, then northwards through Darreh Saqi, Duliskun, Sich, joining road given at Dinarabad. (*b*) West of route described is road *viâ* Darreh Duzun, Sarab Dara, Chakalbandi, Baba Ali, Bid Hal, Tang Khush Garru, Milleh Takht, Palkun—said to be generally level.

Early the following morning, at Kaivareh, Ali Mardan Khan, the most energetic of the Bairanvand khans, who was being used by the Russians (then still in occupation of Burujird, Kermanshah, and Hamadan, though the armies were in a sorry state of indiscipline on 25 September 1917), called with some eighty *sowars* and a Russian Imperial flag. He was wearing a Russian tunic of bright blue, Russian trousers and top boots, but a high Lur *kulah* tied about with the usual black-and-white handkerchief. I lunched at his tent. Tea was served in silver cup-holders, and great lumps of ice were floating in the water.

At noon we mounted again. Preceded by the flag and two caparisoned horses, and followed by a large number of *sowars* marshalled by a *vasaul* in a frock-coat of green and gold, we made for the city of Burujird. Near the city a small cavalcade of the Deputy Governor's Gudarzi *sowars* met me, and in deference to the Persian superstition we entered the city by the south gate for luck.

From Burujird to Khurramabad, the Kashgan and Kirmanshah.

I had no intention of returning to Bala Gariveh, but soon after my arrival in Burujird news was brought that a large caravan of cotton goods, mostly British owned, had been looted near Khurramabad. In spite of the axiom that you should never retrace your tracks in turbulent country, I felt it my duty to return to see if anything could be done. I may say at once that I failed utterly, and moreover was kept in Khurramabad, virtually a prisoner, from 25 October 1917 to 23 January 1918.

On October 24 then I left Burujird with Ghulam Ali Khan, one of the senior *khans* of the Bairanvand, and spent the night at a small village in the Dinarabad pass. We left at 6.40 the following morning, reached the summit of Puneh at 8.45, the Hurud river at 11, and Namaklun at 2 p.m.* Our progress from this point was slow owing to the necessity of keeping the caravan together and of never going beyond a walk in the vicinity of camps, for a body of cantering horsemen is always assumed to be hostile. At the Tang-i-Zahid we found that a few rifle reports had started a rumour that the "Consul" had been looted and the Bairanvand tribesmen of the Mal Asad section had occupied the pass to complete the good work, in spite of the fact that I was accompanied by one of their senior *khans*. However, when they learned that they had not got to do with a party in distress they became more conciliatory and accompanied us some way. It was dark by the time we reached the Kemalvand valley, where we passed camp after camp, with twinkling lights and thousands of sheep penned between the rows of tents. At each we were challenged, and the rather vague reply, "*sowar-a*—it is *Sowars*," seemed to satisfy them.

On arrival at Khurramabad I found myself in a hostile atmosphere, for nearly all the tribes of Bala Gariveh had participated in the affair of

* The Hurud district was practically deserted, for the Bairanvand had already started to move down towards their winter quarters, the rearguard being in the neighbourhood of Makhmal Kuh.

the caravan, the Baharvand and some of the Mirs as the actual looters; the others and a large proportion of the townsmen as receivers of stolen goods. All were therefore equally interested in defeating my efforts, Furthermore, the Baharvand had left the Khurramabad plain for their winter quarters and were less accessible. Certain sections certainly wrote in to express their desire to bring in their loot, so that the profitable trade route should not be closed; but the stuff was gradually being frittered away, and they finally came to the conclusion that their guilt was irreparable and they might as well make the most of what they had got.

Nazar Ali Khan, Vali of Pish-i-Kuh, had in the meantime been appointed acting-governor of Luristan by the Persian Government, with orders to proceed to Khurramabad; but he had lost much of his former energy and wasted so much time in collecting his force that the hostile party, under the guidance of the Chaqarvand of the town, were given time to arrange to oppose him. By November 16 the last of the Bairanvand had passed out of the Khurramabad plain on their way south, and the advanced *sowars* of the Sagvand Ali Khani appeared to select camp sites for that tribe. A few days later they moved westwards along the Chigini road, and in alliance with Bairanvand of the Matash, Mustafa, and Tari sections, and some of the Chigini of the Hatimvand section, prepared to oppose Nazar Ali.

On December 10 I rode out to the Sagvand camp, in the hope either of persuading them to cease their opposition or of going on myself to join Nazar Ali and so get out of Luristan. The Sagvand refused me passage and detained me for three days, and I was only able to regain Khurramabad by a stratagem, with the help of my hen-pecked friend Valiullah Khan Bairanvand, who had a camp in the vicinity. Nazar Ali finally arrived on December 24. He remained in Khurramabad for a month, and on January 24 we left for the Kashgan. Shots were fired at us from the town as we left, to speed us on our way. The main road through the Chigini skirts the lower slopes of Safid (Ispi) Kuh, and there are several points where a few snipers could command the road and cause considerable annoyance. Owing to the hostile attitude of a section of the Chigini, we kept to the south of the river and followed a well-defined road, easy for animals but unsuitable for wheels, over rolling hills, past the winter camps of the Sagvand Ali Khani. We crossed to the northern bank of the Khurramabad river and just east of the Dureh stream which enters it from the north, and stopped at the camp of Kadkhuda Gul Nazar Chigini near a hill called Qulailun (23 miles), arriving about 6.30. As we approached the Sagvand camps, their *khans* with the other chiefs of the hostile combination rode out to give us an *istiqba*, Nazar Ali having come to some accommodation with them.

At this season the tents are protected at the sides by hurdles of boughs, and in some cases a prolongation is built of boughs and mud.

Soon after dark shouts, screams, and volleys of foulest abuse began to

arise from the next tent. It was Nazar Ali Khan. This chieftain, the most powerful man in Luristan after the Vali of Pusht-i-Kuh, is a confirmed drunkard and opium smoker, and indulges his weaknesses according to a regular programme. By day he is a quiet unassuming man with an apologetic manner. Every night of his life, after his evening meal, he sits down to consume quantities of neat *araq* or other spirit, and under its influence begins to abuse all and sundry for any incidents that may have displeased him during the day, though passed over apparently unnoticed at the time. He has been known to shoot a servant dead on one of these occasions. That evening he threw all his bedding on the fire, and rose several times to beat his servants, who fled precipitately. Then he settled down to mumble abuse at his second son, who had been thrown from his horse earlier in the day, with the same cycle of untranslatable words—*pidar sag, boweh sag, qurumsaq, dayus, jakash, bi pidar, bi madar, pidar sag*, etc. Early in the morning he smokes a small quantity of opium to calm his alcoholic head, is capable of transacting business for about two hours, from nine to eleven, and then settles down to smoke large quantities of opium till dinner and drinking time. He makes no bones about his habits, and once, when I suggested seeing him about something in the evening, he replied, "I am sorry; that is my time for getting drunk, and I shall not be in a fit state to transact business."

Soon after mounting the following day we reached the Kashgan river (24 miles), flowing south-east in a broad shingly bed, just before it makes a right-angle turn to the south-west. There was here a camp of Hayat Ghaibi *saiyids*, of whom there are about four hundred families in the vicinity of the tomb of Hayat Ghaib, situated in the Tang-i-Tireh near the Kashgan bend.

The other family of *saiyids* found in Luristan is known as Ahu Qalandari, the Mendicants of the Gazelle. There are four hundred families. In summer they camp in the Hurud valley; in winter they move, some with the Baharvand to Arabistan, some with the Bairanvand to Pusht-i-Kuh, others no further than the Chigini.

Except for the black handkerchief round the felt hat these *saiyids* are indistinguishable from the Lurs in appearance, language, or habits. They live in tents, thieve, have their blood-feuds and matrimonial alliances. The sanctity of their alleged origin, however, does secure them to a certain degree from molestation, and they are said to be rich.

From the camp of the Hayat Ghaibi *saiyids* we followed the left bank of the river, north-westwards, over rolling downs grown with ilex, with patches of cultivation in the rich brown soil, to the camp of Kalantar Ibrahim of the Shiravand tribe at Baraftab Gam, about a mile from the Kashgan bridge (28 miles).

This bridge is of some antiquity, probably of Sassanian or early Arab construction. Former travellers report a stone with a Kufic inscription, but I did not see this. The piers are faced with dressed stone, but

rounded, not pointed, on the upstream side. The upper structure is of artificial conglomerate known to Persians as *sang-bandi*. The river runs in the east side of the bed, and the first five arches, counting from this end, have disappeared though the piers stand high out of the water and appear solid. A low arch of modern brick joins piers three and four. Arches six to thirteen, all pointed, still stand, though ruinous in places, and I was able to walk along to the end. Each arch is smaller than the last, and the last two turn sharply south-west into the bank. The surface of the roadway is broken up, and scrub oak grows out of the conglomerate.

The next day, January 26, we forded the Kashgan about 200 yards below the bridge, the water being about 2 feet deep. The road then took us through park-like wooded country, ascending gradually to the foot of the Ghuraz chain. The path up was narrow and steep, and there was 2 inches of snow on this, the shady side (styled *nisar* as opposed to *baraftab*, the sunny side). From the summit there was a magnificent view eastwards down the Chigini valley and the Khurramabad plain to Taf, its mantle of fresh snow sparkling in the sunlight; southwards the wide expanse of Kuh-i-Dasht, and then line after line of snow-clad mountains, ending of course with the sharp dominating outline of Kabir Kuh. In the hollow between the double Ghuraz range were tents of the Mumivand Nur Begi. The descent from Ghuraz was difficult in places. Near the plain is a dam that holds up the stream flowing down the pass, forming a reservoir now overgrown with canes.

The Kuh-i-Dasht is an immense plain, at an altitude of about 4000 feet, measuring about 10 miles by 8, as flat as a billiard table. It is wholly devoid of trees, and has comparatively little water. There are a few mounds said to cover ancient ruins. Truffles are found, and the plain abounds with gazelle. Camps of various sections of the Dilfan were dotted over it. Nazar Ali was building himself a new fort to replace one destroyed by the Vali of Pusht-i-Kuh three or four years before. In any case he never lived in it, preferring his tent. We stopped at a camp of the Ivativand, and remained in the Kuh-i-Dasht the next day to hunt gazelle with greyhounds.

On January 28 I parted from Nazar Ali at 9 a.m. Keeping south of an eminence, Surkhdum Lakki (52 miles), we marched through Gandaweh, and at 11.15 reached a forest of ilex. At 12 we entered the broad plain of Kishmahar, which, unlike the Kuh-i-Dasht, is undulating, waterless, and to a certain extent wooded. A blizzard now came on hiding the whole country. Instead of taking the more usual route *viâ* Garmehi, we went to the end of Kishmahar and took the pass of Gaduk Viyun, where we disturbed a herd of some fifty moufflon. From the summit we looked down into the Hulailan plain, with the Saimarreh river winding through.

We reached the foot of Viyun at 4.45, but nowhere could we see the camp we had expected to find there. Finally we made for the shrine of Shahzadeh Muhammad (79 miles), where there is a settlement of *saiyids*

living in tents and mud huts. The Gumbud Shahzadeh Muhammad is a pretentious building, and has a great reputation for sanctity in the district. The Vali of Pusht-i-Kuh, Nazar Ali, and other notables have contributed various parts, one the golden ball over the dome, another the bath, and so on.

We mounted at 9 a.m. and marched northwards across the Hulailan valley, where some Kakavand tents were to be seen. The district is said to produce three crops of maize in a year, but owing to locusts no wheat had been grown for seven or eight years. Truffles in large quantities are found in spring. About 1½ miles from the tomb the river Saimarreh is crossed. Water at the ford was some 2½ feet deep, but guides were required to find the place. North of the river were several ill-smelling puddles giving off an odour like that of sulphuretted hydrogen. The valley crossed, the road follows an ascent called Pusht Bureh, and runs thence over the plain to another rise called Pelleh Kabut, the boundary between Hulailan and the Jelalvand country which we now entered. We followed the Jezman stream for a short distance, then a tributary called Tekkiyeh, and made straight for a gap in the hills called San Rustam. The natural road to follow would have been through San Rustam, but as there was no convenient stage we turned west to the house and permanent village of Ali Jun Khan Jelalvand, some 16 miles from the shrine.

The following day we marched north-westwards up the valley, past several villages, a pleasant reminder that we were out of Luristan, and then turned north to cross the Taviran pass, then under 6 inches of snow. At the small village of Garrain we crossed the Ab-i-Tekkiyeh, flowing eastwards to San Rustam, and negotiated our last pass, the Khalailan, into the Mahidasht plain. As we approached the Kurdish village of Sarv-i-Nau (121 miles), where I had decided to spend the night, heavy rifle-fire broke out from the village. We had been mistaken for a hostile party coming to raid, for it was the misfortune of Sarv-i-Nau to have a blood-feud with nearly all the neighbouring villages, and so to live in a perpetual state of apprehension.

The shrine is only 1½ miles from the Saimarreh river, the boundary of Pish-i-Kuh. My last two marches, therefore, do not fall within the scope of this paper.

On January 31 I reached Kermanshah (130 miles) and the hospitable atmosphere of the British Consulate. I remember how I was filled with a sentiment of unutterable relief at having shaken the dust of Luristan from off my feet, feeling with de Morgan on a similar occasion, happy indeed to have made this journey but gladder to have finished it.

Before the paper the PRESIDENT said: I have much pleasure in introducing to you Mr. Edmonds, who was for some years, both before and during the war, Consular officer in the south of Persia. During the war he was transferred from Persia further west, and he is just leaving to take up the work of what used to be called "Political Officer" (now I understand "Divisional Officer"),

that is, of an officer whose duty it is to advise the newly-established Government in Kurdistan. He has been so kind as to delay his departure, and travel overland to catch his boat, in order that he may give us this lecture to-night.

Mr. Edmonds then read the paper printed above, and a discussion followed.

General J. A. DOUGLAS: I think we may all congratulate the lecturer upon the very interesting details he has told us about the country, though personally I must confess to a certain sense of disappointment. I was in hopes he would have attributed to the Lur some of the more primitive virtues, not that I might agree with him, but in order that I might get up and emphatically deny that they had any! But he has, as it were, taken the words out of my mouth, and I can only endorse what he has said; I thoroughly believe that the greed of gain is so deeply implanted in the Lur mind that there is not room for any even of the more primitive virtues to flourish beside it. Their one idea is robbery. The lecturer referred to the experience of myself and Captain Lorimer in the country, and it was not such as to make either of us in love with the Lur. They had accepted a considerable sum of money, they had sworn on the Koran to see us safely through the country, and they only waited until they got us into the middle of it to demand large sums of money which we were unable to give them, and they then turned upon us and robbed us of everything we possessed. So that, though I am possibly in a position to speak with some authority as to the character of the Lur, I am afraid I have not seen enough of the country to add anything to what the lecturer has told us about it to-night. It is an interesting country, and, as Mr. Edmonds has said, there are not many people who have been through it of recent years, and it would stand a good deal of exploring, but the nature of the people is not such as to encourage much adventure there. The lecturer has not given us any opinion as to the fighting qualities of the Lur, which, I think, is rather an interesting subject. But it is very difficult to form an opinion. Like most hill tribes, they are formidable in their own country, but I doubt if they would put up any sort of a fight if they were opposed to good troops. Among the Persians, of course, they have a very bad name; in fact, the Persians are very frightened of them indeed. It was not long before I was there that a party of twelve hundred Persian troops were on their way through, marching down in relief. They were held up by the Lurs, robbed of everything they possessed, including their arms, and sent back ignominiously in a portion of the clothes they had taken with them. It was not such a formidable feat as one might have imagined, because it was rumoured at the time that the cartridges with which they had been provided had had the gunpowder extracted and earth put into its place, which shows us, perhaps, that economy in the Fighting Services can be carried too far. But I do not think myself it would be at all a difficult thing to subdue the Lurs if there were any reason to do so. Like most Persians they have a very strong objection to risking their lives, and would probably give in at once if they were attacked. I do not think I can add anything more to what the lecturer has told us. As I have said, my own experiences in the country were brief and unpleasant.

The PRESIDENT: It is very seldom that one hears of a people who have not some good point about them, and I was hoping General Douglas would have discovered one. You will have understood from this lecture what an exceedingly difficult and most unsatisfactory kind of task it must be, to have dealings with a people of that kind. As General Douglas has said, if you had a military force and went in there and tackled them thoroughly, the thing

could be done. But what political officers have to do out in Luristan and Kurdistan and those parts to which the lecturer is returning, is to establish influence entirely through their own personality, for they have not a military force behind them now. By advice simply and by personal influence, they have to establish some kind of order and bring some degree of civilization amongst those most unsatisfactory people. Having listened to Mr. Edmonds, we in this Society shall follow his adventures on his return to Kurdistan, and we shall understand something of the kind of difficulties he has to face, and shall realize, too, the calm and tactful and humorous way in which he sets about his duties. And we shall hope that, having given us this delightful account of Luristan, he will return to us in two or three years, and give us an even more charming account of his adventures in Kurdistan.

A SURVEY OF THE EUPHRATES VALLEY FROM DEIR-EZ-ZOR TO ALEPPO

Major C. G. Lewis, R.E.

DURING the winter of 1918–19 I was engaged on survey duty in the Euphrates Valley, under the Survey Directorate of the Mesopotamia Expeditionary Force, with instructions to carry out a topographical survey of the valley up to Deir-ez-Zor, at that time the limit of civil administration in Iraq. On arrival at Deir, having carried triangulation up to that point, there seemed to be no reason why the survey should not be continued further up the valley, and indeed the subdued state of the tribes at the close of successful campaigns in Iraq and Palestine offered a unique opportunity for such work. I was therefore directed to endeavour to take the triangulation on to Aleppo with as much detail survey as possible. A brief account of the journey may be of interest.

Up to Deir-ez-Zor the survey had proceeded more or less at leisure by normal methods; detail survey by plane-table on the 1-inch and ½-inch scales, executed by two Indian surveyors, followed the triangulation. Beyond Deir more rapid methods were for various reasons necessary. The route lay outside the area of British administration in the jurisdiction of the newly set-up Arab Government, whose officials had not yet been apprised of my coming. Shortly after leaving Deir I was one day overtaken by a ragged *zaptieh* bearing a letter from the acting Kaimaqam of Raqqa, in which he intimated that my presence in his district was undesirable, that he did not require a map of the country, and would I return to Deir without delay. I replied politely that my work had the full approval of his government at Aleppo, and that he would doubtless receive information to that effect before long. But to avoid complications I judged it advisable to loiter as little as possible, especially as the demeanour of the Arabs at this point was not too friendly—some of them were on one occasion only with difficulty dissuaded from requisitioning the clothing of the entire party, during my absence on a neighbouring hill.

I was provided with an escort of six Arab *shabanas* (police) armed with antiquated rifles, not one of which—as I discovered after the last-mentioned incident—could be actually discharged. The remainder of the party consisted of two British drivers of the R.A.S.C., in charge of the two Ford cars ("vanettes") with which I was fortunate enough to have been provided, and a small squad of Indian survey *khalassis*. The Political Officer at Deir engaged a dozen camels for the transport of tents and baggage, and furnished me with rations for the journey; after the customary day's delay owing to the non-appearance of the camels, I set out from Deir on 4 March 1919.

The River Trade Route, with its numerous interesting ruins, is so well known as not to need further description other than a few remarks on the conditions then prevailing. During the war the Turks commenced work on a metalled road from Aleppo to Baghdad: a few short sections, usually in the neighbourhood of *wadi* crossings where bridges or culverts were required, had been completed and were in use, but not being kept in repair were rapidly wearing out. About half the road from Aleppo to Meskeneh, as far as Deir Hafar, had been laid out, but the metalling was not consolidated and it has never been actually used. It is doubtful whether anything but traces of this road now exist, though many of the bridges and culverts should still be in use for many years. The ordinary track is well suited to the prevailing traffic and is perfectly feasible for light cars when the *wadis* are not in spate. I made the return journey from Aleppo to Baghdad, some 550 miles, in five days. Another feature, doubtless due to the war and to the passage of Turkish troops, was the paucity of scrub growth in the valley. Previous travellers have remarked on the large areas of tamarisk scrub occurring in many parts; these are now greatly reduced, many places being entirely denuded. At Meskeneh, for instance, I had great difficulty in procuring wood. I had noticed that the derelict telegraph line which had hitherto kept me company, sagged wearily to the ground some distance before the village. The reason for this was made clear when the captain of the Arab detachment quartered there reluctantly offered me half a telegraph pole, in response to my request for firewood. While at Meskeneh I met the real Kaimaqam of Raqqa returning from Aleppo. He was much concerned when I showed him his substitute's letter, and asked me to report the matter at Aleppo.

The Euphrates valley, contrary to expectation, provides a favourable field for rapid triangulation. Its width between the well-defined edges of the adjacent plateaux of the Jezirah and Shamiyah is on the average about 6 miles, and admits of triangles of a size in accordance with the general accuracy of the class of work carried out, without excursions "inland"—a term which may suitably be applied to the desert from the point of view of the traveller along the river-banks. Confined as one was to the right bank of the valley, without means of crossing the river, it was necessary to select sufficiently well-defined pivot points on the opposite side for the

formation of triangles. Throughout the length of the valley, situated on the higher eminences on either bank are occasional Arab graves marked by stone cairns. It was these cairns that saved the situation. They formed as good a mark as a topographer could wish for in the absence of one constructed for the purpose. In such places—and they were few—where no suitable points were available for intersection on the left bank, it was necessary to extend the triangles over the right-bank plateau; and on these occasions one realized the difficulties that were being avoided by the use of the valley depression. Mirage became the ruling factor. It reduced the length of side to 2 or 3 miles; any mark at a greater distance was indistinguishable unless considerably raised above the level of the plain. Owing to the existence of these cairns it was seldom necessary to prepare forward stations: the highest point of a cairn was observed to, and on visiting it subsequently, care was taken to place the mark-stone vertically below the original highest point. Stations were marked by a circle and dot inscribed on a stone, the latter being set at ground level in the centre of the cairn. Many of these cairns have evidently been standing for long periods and are probably as permanent as anything in the country.*

The theodolite used was a 5-inch micrometer by Messrs. Cooke, reading to 10 seconds, an instrument capable of a high order of accuracy having regard to its portability and small bulk. A few points were fixed by intersection in the Jebel Bishri and in the hills north of Palmyra, some 60 or 70 miles distant; but otherwise few distant points were visible. As a check on the triangulation bases were measured at Albu Kamal, Deir, and Aleppo: two measures of each with a 500-feet steel tape; and azimuths were observed at intervals of about 70 miles. There was an average difference of 35″ between the observed azimuth and that brought up through the triangulation from the previous azimuth station. Computations were completed up to date each evening; the use of spherical co-ordinates made this work somewhat irksome, but saved subsequent labour. Beyond Meskeneh the computing fell into arrears, but by working out triangles only, I was able to plot points sufficiently accurately by azimuths and distances.

"Detail" of the valley and of as much of the adjacent country as was visible, was put in by means of the plane-table on the $\frac{1}{4}$-inch scale. The course of the river was well visible at all times and should be accurate, though it is probable that some islands and smaller branches have been omitted. The existing maps, based mainly on Chesney's survey of 1839 as regards the river, show how completely the latter has changed its course within the limits of the valley floor during the interval of eighty years. In the area between Meskeneh and Aleppo the survey shows but few points of resemblance with the old map, the latter having been compiled from reports and uncontrolled sketches.

* The mean triangular error of 10″, from 65 triangles, is an indication of the suitability of the signals (existing cairns); four measures of each angle were taken.

The method of transport lower down the river had been by *shaktur*, the local boat fashioned of rough planks, somewhat similar in proportions to a matchbox with slightly sloping ends, and made watertight with bitumen. These boats can carry a load of 4 tons and are towed upstream, but the rate of progress is very slow, only 5 or 6 miles a day, and less in difficult parts of the river. Downstream, *shakturs* travel 40 to 60 miles a day in mid-current when the river is in flood. Progress by this form of transport was much too slow, although it had the advantage of providing access to both banks of the river; from Anah onwards I abandoned it in favour of camels. From Deir the average day's march was 18 miles, or 15 miles including in the calculation three days' halt *en route*. To carry out triangulation computed up to date daily and detail survey at this rate single-handed would have been impossible without the assistance of the two cars. I used them throughout as a means of rapid transport from station to station, for myself and the men carrying the instruments.

One cannot avoid a brief comment on the remarkable change in the country on striking west from Meskeneh. Shortly after leaving the river one enters upon a settled and cultivated region in marked contrast with the desert adjoining the Euphrates Valley. This is the basin of the Jebbul Salt Lake. Running streams are crossed every few miles, meandering towards the distant lake; in many places the ground is boggy and impassable for cars. The last settled village in the valley is Raqqa, 60 miles distant; but here villages hustle one another in their proximity. The absence of timber, and possibly the greater rainfall, have evidently exerted an influence on rural architecture. Each village resembles nothing so much as a collection of conical beehives, in which the flat timber-supported roofs common in town dwellings are replaced by innumerable pointed domes of mud, requiring no wood in their construction.

I reached Aleppo on March 20, sixteen days after leaving Deir. Survey operations in Palestine had not at that time reached Aleppo, but the officer in charge very kindly came up to meet me and arranged for the inclusion of my last stations in his triangular network, which was of a high order of precision. Their values in terms of the Palestine Survey were received subsequently and showed the closing discrepancies to be: $-7'9$ secs. in latitude; $+1'1$ secs. in longitude; and -30 feet in height:* a satisfactory result in view of the small degree of accuracy to be expected from this class of triangulation. No astronomical determinations of latitude were made between Baghdad and Aleppo. The difference in longitude between Baghdad and the Fao (Basra) longitude station had been determined by wireless signals; and longitudes in northern Mesopotamia were based on the Baghdad value.

* The approximate height of the river above M.S.L. at Deir-ez-Zor is 690 feet; at Raqqa 840 feet; at Meskeneh 900 feet.

The following are the corrections to hitherto accepted positions:

	Lat.	Long.	
Aleppo	+0′ 20″	... +1′ 10″	
Meskeneh	+0′ 30″	... −4′ 10″	Chesney's survey
Raqqa	+1′ 20″	... −2′ 0″	controlled by
Deir-ez-Zor	+1′ 40″	... −3′ 0″	astronomical
Meyadin	−0′ 30″	... −3′ 30″	observations.

The survey was represented in sections on a single sheet at M.E.F. Survey Office in Baghdad in October 1919.

THE PERMANENT COMMITTEE ON GEOGRAPHICAL NAMES

WE are glad to publish the following appeal from Major-General Lord Edward Gleichen, Chairman of the P.C.G.N., and to emphasize its claim upon geographers. The work of the Committee was begun at the request of the Admiralty, and provision was made for it at first from public funds. The Society has given the Committee house room and much assistance, besides spending about £450 on printing the results of the work, and can for the present afford little more. Unless, therefore, it finds some further support at once, the Committee will have to acknowledge that the first adjective of its name was ill-chosen, and close down its operations, with great waste of accumulated material.

AN APPEAL TO THE FELLOWS OF THE R.G.S.

A leaflet was issued with the *Geographical Journal* for this last April, explaining the work that the Permanent Committee on Geographical Names (consisting of representatives from all Government Departments meeting under the ægis of the R.G.S.) was carrying out, and stating that, owing to the inability of the Treasury to continue the grant on which it had hitherto subsisted, the enterprise was on the point of extinction, unless funds from somewhere else were quickly provided.

The broad hint thus conveyed met, I regret to say, with practically no response whatever. The only subscriptions received from the whole of the Fellows of the Royal Geographical Society, some 5400 in all, were two—one for one pound and one for ten shillings sterling!

I cannot bring myself to believe that this "blank draw" was entirely due to the want of interest taken by the R.G.S. in the work of the P.C.G.N. It must have been due to the method of appeal, and to the fact that the leaflet was, for those who took the trouble to read it, not worded in a sufficiently urgent manner. In the first place, it is only human nature not to read a leaflet, especially if, in these hard times, it looks as though it were an appeal for subscriptions; and in the second, the leaflet omitted to say that "the smallest subscription (half a crown and upwards) will be thankfully received." It is unnecessary again to tell those who have read the leaflet what the work of the P.C.G.N. has been for the last three years; but to those who have not, I should like, as its chairman, to point out that the object of the Committee is,

shortly, to standardize the proper spelling of foreign place-names throughout the English-speaking world.

This object may not appeal to every one: and I willingly grant that there are several other things in this world on which money might perhaps be more generally lavished. But when the reader learns that he is asked only to subscribe a modest sum of a few shillings (or a little more if he is particularly generously inclined), and does so, I am sure that he will be only too glad to feel that he has "done his bit" towards carrying out a great work which is urgently required.

For the chaos now existing in the spelling of foreign place-names is indescribable. Every map-maker, every writer, every journalist, has his own ideas about spelling them. Are you going to spell the names Kiau-Chau, Kiao-Chow, or Kyouchow? Bucharest, Bucarest, or Bukarest? Cettinje or Tsetinye or Cetinje? Châlon, Chalons, or Chalon? Leipsic or Leipzig? Walvis, or Walfisch, or Walfish Bay? Teheran or Tehran? Bosphorus or Bosporus? Assouan or Assuan or Aswan? Tukuyu or Neu Langenburg? Bismarckburg or Kasanga? Jeddah or Jidda or Jedda? Leghorn or Livorno? and so on for hundreds, ay thousands, of names. Surely it is worth while bringing order into this chaos—not only for purely literary, but for very practical purposes as well.* And the P.C.G.N. also tells you how to pronounce words, *e.g.* Salonika, Przemysl, Angora, etc., as well as spelling them, correctly, and has issued a work (Technical Series, R.G.S., No. 2) on the pronunciation of some 55 different languages.

I might add that the United States has for the last thirty-two years had an official Board laying down the spelling of places in the U.S.A. only; and that Canada has a similar Board: surely Great Britain, with infinitely greater world-wide interests, should not be behindhand.

The President of the R.G.S. has therefore kindly allowed me to insert this appeal in this *Journal*, and directs me to say that he would be most grateful if every Fellow could find it possible to send even a small, but *annual*, subscription of a few shillings (say five to ten) to support the work. [Such *annual* subscription should be sent as soon as possible (or an order given to the bankers to this effect) direct to the Assistant, P.C.G.N., at the Royal Geographical Society, and should be kept distinct from the annual subscription to the R.G.S.] All those who so subscribe will continue to receive (free) the name-Lists issued from time to time; but it is regretted that it will no longer be possible to issue them to non-subscribers.

Finally, it has to be pointed out that unless this appeal meets with a willing and general response,† the work of the P.C.G.N., up till now in full swing, must cease; for the appeal to other Societies and Public bodies has met with but very limited success, and without the hearty support of Fellows of the R.G.S., this valuable work will, within the next two or three months, come to an abrupt conclusion.

EDWARD GLEICHEN, Chairman P.C.G.N.

15 May 1922.

* The P.C.G.N. is, in collaboration with the local authorities, laying down the correct names in Mandated Territories such as The Cameroons, Tanganyika Territory, 'Iraq (Mesopotamia), etc., and in other colonies. It also, for instance, settles whether native or European names in the Pacific or elsewhere are to be adopted, and which; the spelling of battle-honours, etc., etc.; and more especially is its work valuable in the case of marine charts. Many people have indeed already written testifying to the practical importance of the work.

† A notification on this subject will be issued before next November.

THE MOUNT EVEREST BOOK

Mount Everest: The Reconnaissance, 1921.— Lieut.-Colonel Howard-Bury, D.S.O., and other Members of the Mount Everest Expedition. London: Edward Arnold & Co. 1922. Pp. x. and 356. *Maps and Illustrations.* 25*s. net.*

THE Reconnaissance Expedition of 1921 to Mount Everest meets with a worthy record in this handsome, well-printed, and finely illustrated volume. Both the authors and the publishers are to be congratulated on having been able to put the work in the hands of the public with such promptitude and at a moderate price. It is also fortunate that the writers who chiefly contribute to the text prove themselves able not only to travel and to climb, but also to observe and to describe so well that every reader who cares for mountains and sublime scenery can follow in their footsteps with unflagging interest.

The volume opens with an emphatic assertion by Sir Francis Younghusband of the claim of mountaineering to a front place among the outlets for the physical energy which is characteristic of the British race and has incidentally helped to create the British Empire. He goes further and looks on it as an incident in that struggle of the human spirit against material obstacles which has marked the progress of mankind. He is content to say to the utilitarian who asks, "Of what use is it?" "None at all from your point of view," rather than to refer him to the practical and commercial results that have in many cases followed on mountain exploration.

The story of the expedition, treated as a whole, is admirably told by its leader. The Society and the Alpine Club were fortunate in having at hand in Colonel Howard-Bury one who was not only from his previous Himalayan and Tibetan experiences exceptionally competent to deal with the local difficulties, but was also as a skilled describer and photographer of mountains, a sportsman and a great lover of flowers, singularly well qualified to observe and depict the natural features of the region to be explored. His chapters are consequently far more than a tale of mountaineering; they will furnish geographers with a living picture of a portion of the Earth's surface which has hitherto been not only unknown but misdescribed! About the date of the march to Lhasa it was the fashion to portray Tibet as a whole as a howling wilderness. Bleak and bare in parts it doubtless is; and the contrast found in the sudden transition from the lavish profusion of Sikkim forests to its chilly uplands makes the impression on the traveller's mind and memory the more vivid. But the party had made but a few marches beyond Kampa Dzong before we find ourselves overlooking one side valley in which fifteen villages are in sight at once, or another pictured as a mass of wild rosebushes covered with hundreds of sweet-scented blossoms 3 inches in diameter. And when we reach later in the journey the Arun Valley and Kharta, we read of hillsides covered with barley-fields, "country houses" surrounded by groves of poplars and willows, watercourses outlined by banks of tall primulas.

From the Tibetan authorities, and in the convent-fortresses visited, the expedition met with consistent friendliness and help in the form of supplies, and a venerable abbot, the doyen of living saints, proved willing, by consenting to be photographed, to add an object of devotion for the shrines of his worshippers. In the more secluded valleys under the great peaks the explorers found bevies of anchorites of both sexes, spending years of seclusion in holes of the rocks, engrossed in meditation and cut off from human society, but

making friends, like St. Francis, with the birds and wild animals, whose slaughter was strictly forbidden. The villagers and country proprietors were uniformly well disposed. Even the coolies, generally hired from village to village, proved fairly effective, though the statement that they reckon distances by the cups of tea consumed, on an average three cups to 5 miles, suggests that their halts may have been inconveniently frequent. But the little band, selected and trained for high ascents by the mountaineers of the party, earned praise for the endurance and spirit shown by them in difficult climbs and moments.

Not the least attractive from a literary point of view of the contributions that follow is that of the climber, Mr. Mallory. By the unfortunate death of Dr. Kellas and the subsequent illness of Mr. Raeburn, both of whom brought Himalayan experience to the common stock, he and his colleague Mr. Bullock were left in a position of exceptional difficulty and responsibility. Mr. Mallory gives a singularly clear, modest, yet vivid description of the difficulties that had to be met and surmounted in reconnoitring the approaches to the great mountain, of the solemn splendour of its northern glaciers, the woodland charm of its eastward glens, overhung by the icy precipices of Makalu, a peak which is likely to become a rival for the prize of beauty to the Sikkim Siniolchum. We may also note that Mr. Mallory has set a good example to the Alpine Club by discarding for the most part the foreign technical terms (Bergschrund, couloir, arête, and the like) which have been far too frequent in our climbers' books of recent years. It may however be suggested that the old English "gap" is better than "col" for an impracticable saddle. Col, whatever its Latin derivation, has come to connote a pass.

Dr. Wollaston, an explorer hardened in Central Africa and New Guinea, adds the notes of a naturalist and recounts the obstacles a collector meets with in districts where all animal life is held sacred, and the birds and small animals live in relations of mutual confidence with mankind. A botanical list shows that if novelties, after the researches of Sir J. Hooker and others in corresponding regions of Sikkim, were few, the flora is rich in exquisite varieties. Primulas are found in special abundance, there is a lovely blue poppy, and several fascinating varieties of large and small starry gentians. In a concluding chapter, Prof. Collie, writing from the point of view of a president of the Alpine Club and a Himalayan traveller, gives a summary of the work done by the Reconnaissance. In so doing he has in some degree anticipated and rendered superfluous the task of the expert reviewer. But it may perhaps be permissible and useful to emphasize here the main orographical results recorded in the volume before us, and to indicate a few points on which further information may be looked for next year.

The work of the Mount Everest party sent out from England seems to resolve itself into two sections; the first in importance, as connected with its main object, was the search for a practicable approach to the summit ridge of Mount Everest; the second was the investigation of the peaks and passes in the stretch of some 90 miles between Makalu and Gosainthan. The former again may be divided into the story of the northern approach from the basin of the Rongbuk glacier, and the eastern from the head of the Kharta valley. The Rongbuk valley below the snow-level is a bleak and monotonous glen, a long straight corridor redeemed only by the great Colossus that looms at its head. Its glaciers so far as they were examined appear to afford no practicable passage southward, while the ridges that fall westward from the cliffs of Mount Everest are, to put it mildly, uninviting to a climber's eye. No ready access to

them from the snowy reservoirs that fill the deep hollows at their base revealed itself to the explorers. The north-east crest, the upper portion of which had suggested itself to distant observers as a possible path to the final peak, appeared equally unapproachable from the Rongbuk snowfields. Accordingly at the end of July the climbing party moved their camp by a considerable detour to the Kharta valley on the east side of the mountain. They had by a singular mischance just missed the key of the problem. Hidden away behind the ridge on the east of the Rongbuk glacier lay another large ice-stream which flowed straight from the base of the desired north-east crest. The stream issuing from it was relatively small, and thus failed to attract notice. A few days later, however, the officers of the Indian Survey, who were more or less attached to the party, but had been prospecting farther west, began to attend to the Rongbuk and discovered this hidden glacier, which they named the East Rongbuk. They pronounced it to be practicable throughout; this news reached the climbers at Kharta in the middle of August. For them and still more for the world this delay had its compensations. But for it the glories of the Kharta and Kama valleys might have remained undiscovered, we might have lost the pictures of their magnificent forests of gigantic junipers and silver firs, of the fields of mountain flowers, of the tumbling torrents that fall precipitously from the stupendous precipices and glaciers of Makalu and its rocky satellites. After the story of arduous struggle and endurance among the treasure-houses of the snow the reader turns with delighted surprise to the pages that record the explorers' arrival in this fairyland, nurtured by the perpetual showers that swim up the great ravine of the Arun river.

Nor was their excursion into a more hospitable region without a direct practical result. Among the glaciers at the head of the Kharta valley they found a camping-ground on stones at 20,000 feet, and a gap of 22,230 feet which led by a descent of 1200 feet to the head of the East Rongbuk glacier. From this pass the view of the upper part of the mountain satisfied them that, apart from elevation, the climb might prove practicable. How an attempt was gallantly made and failed is told by Mr. Mallory. He furnishes some interesting figures. The point reached, called the Changla, 23,000 feet, is 2½ miles from the summit; the part of the final crest to be traversed is about half a mile, in which the rise is only 1000 feet. The climb up the face of the buttress cannot therefore be less than 5000 feet in 2 miles, and a camp on it must be regarded as probably essential to complete victory.

For the rest, the exploration of the chain to the west of Mount Everest was greatly hindered by bad weather. In this respect the expedition met with ill luck throughout. There is good reason to believe that in most years September at least is fair. The Kyetrak glacier which leads to two passes practicable at all seasons, the Khombu La and Pusi La, was first visited. The latter, which is under 18,000 feet and free from snow, was traversed by members of the party who penetrated as far as Nyenyam, near the base of the great peak of Gosainthan. On their return they visited the sacred vale of Lapchekang, overhung by Gaurisankar, a magnificent mountain visible from Katmandu. This part of the narrative might well have been more fully illustrated. We offer the hint to the editor of next year's volume. We may point out another matter on which more precise information will be welcome. In the General Map neither the Nepalese–Tibetan frontier nor the approximate line of the watershed are laid down. We write *approximate* because in a preliminary survey accuracy in precise detail among the masses of a chain can hardly be everywhere attained. It is however obvious that here, as formerly on the Sikkim frontier, it is not

the crest of the range but its southern gorges that constitute the political barrier. Several of the heads of the valleys on the southern slope were made accessible to the expedition by the fact of their being politically Tibetan. It would be interesting to know if this is also the case in the valleys east of and accessible from the Khombu La that lie immediately under Mount Everest. The great southern precipice of the mountain so conspicuous from Sikkim must be a prodigious feature.

The survey party, who were acting under the instructions of the Surveyor-General of India, did not join the mountaineers for some time, but worked separately till the end of August. They report that the outturn of work during the expedition was as follows:

¼-inch revision survey (Sikkim)	...	...	...	1000 square miles.
¼-inch original survey	...	...	...	12,000 ,,
Detail photo survey (environs of Mount Everest)				600 ,,

The last has only just been issued, and not yet in final shape, and the map in this volume is a provisional sketch from photographs, made at Lowther Lodge. Whenever the official map is forthcoming we shall hope to find the name Chomolungma attached to the group of which Mount Everest is the crown, and the official Tibetan name inserted in brackets under the European words Mount Everest. It is clear that it is now too late to call the highest mountain in the world by any other name than that it has borne for more than half a century. But the picturesque title it bears in its own country (by-the-bye, three differing translations of Chomolungma, all more or less poetical, are offered in this volume) should be preserved. And there is evidence here (p. 225) that the name is applied to the whole group just as Monts Roeses (Monte Rosa) was in the sixteenth century made to include all the summits between the St. Théodul and the Weissthor. How loud would have been the protest had the Swiss Survey not been content with naming the Höchste Spitze the Dufour Spitze after their head, but attempted to suppress the traditional Monte Rosa! We would not impute the intention to commit a similar indiscretion to the authorities at Calcutta.

D. W. FRESHFIELD.

REVIEWS

EUROPE

History of the Port of London.— Sir J. G. Broodbank. London: Daniel O'Connor. 1921. 2 vols. Pp. xx. + 532. 63*s. net.*

THIS is likely to be for a long time the standard work on its subject. It records the growth of the port and its organization from the earliest times; but the author naturally devotes most of his space to the harbour and dock developments of the last fifty years. From 1871 to 1920 he was himself an active worker in the port, first as an officer of two of the Dock Companies, and later, since 1909, as Chairman of the Docks and Warehouses Committee of the Port of London Authority. This long experience, and his facilities for access to the Port records, give the author unique qualifications for a task which has evidently been a labour of love. It may also account for the most obvious weakness of the work, a general limitation to an inside view and a lack of comparisons with other ports which might have added to its value. A study of these volumes tempts one to misquote a well-known line and say

"What can they know of London who only London know?"

It is characteristic of this mental attitude that less than two pages are given to a very inadequate account of the position of London, that there is no study of its land communications with the rest of Britain, and there is no map except for a plan of the docks.

The vast entrepôt trade is rightly stressed as the most distinctive feature of the port and the one to which it owed its pre-eminent position in the last three centuries. London's rise to the position of the chief entrepôt port of Western Europe was directly due to the sack of Antwerp in 1576; and that position has since been maintained largely because the frequent recurrence of wars and the political fragmentation of Europe have prevented the rise of a serious rival on the mainland, while England has enjoyed almost unbroken internal peace and unity. The author quotes wool, with a pre-war value of £25,000,000 per year, as the chief item of the entrepôt traffic; and his confident forecast that London will remain the chief market for this, and other colonial produce, takes no account of the post-war establishment of a wool-market in Hull, or of the efforts of Manchester to gain a large share of the colonial traffic in such articles as wool and tea, for which its position gives it an advantage over London as a distributing centre.

Before the Industrial Revolution, London was the only great city and great port of Britain, a fact which is vividly illustrated by the proportions of the foreign trade which passed through it in the 18th century (pp. 75 and 76), namely, in 1700, 77 per cent. (England), in 1737, 67 per cent. (Great Britain), and in 1792, 65 per cent. The 19th century saw a great absolute increase in London's trade, but a marked fall in its relative importance, since in 1913 the corresponding figure was only 29 per cent. of the foreign trade of the United Kingdom. Conditions are still too unsettled to justify any forecast on the basis of post-war figures; but London and Liverpool are too nearly equal for either to be regarded as unquestionably the first port of Britain; and the possession of a far greater hinterland is likely to make New York the first seaport of the world until Europe is so far an economic unit as to permit the development of a correspondingly great port near the mouths of the Rhine. London's greatest asset, as the author clearly recognizes, is the momentum she gained in the past; and this, together with the local advantages of the situation, seems sufficient to ensure still further growth.

This review is mainly concerned with the geographical aspects of the work; but in concluding we must pay our tribute to the clearness with which the author has marshalled the vast amount of detail in his history. The book is indispensable to the student of London as well as to those concerned with dock development or with the history of dock labour. We hope it will stimulate the production of corresponding studies of some of our other great ports.

C. B. FAWCETT.

The Historical Geography of the Wealden Iron Industry.— M. C. Delany. London: Benn Bros. 1921. Pp. 62. *4s. 6d. net.*

This is, it is hoped, the first of a series of research monographs to be issued under the auspices of the Geographical Association. Hence it is of special interest to all concerned for the progress of geographical research. The iron industry is one in the location of which the geographical factors of distribution of raw materials and supplies of power and facilities for transport are practically decisive; since it uses large quantities of heavy and bulky raw materials, only a part of which (from a tenth to a fourth) enters into the finished product. The work begins with a clear account of the distribution of iron ore in the Weald; and a study of the former extent of the woodland,

for which precise evidence is scanty. Then we get a discussion, with maps, of the actual position of foundries and furnaces in the fifteenth, sixteenth, and seventeenth centuries, especially in reference to the introduction of water power to drive the bellows and hammer, and so the change from a scattered home industry to one needing considerable capital and employing large numbers of men in foundries and forges built along the more rapid reaches of the streams.* The author ascribes the decay of the industry solely to the decrease in supplies of timber for charcoal and the absence of good coal, ignoring the facts that the greater rainfall and relief of the north and west of Britain gave the rival iron-working districts better supplies of water power, and that the decline of the Wealden industry was far advanced before coal came into use on any considerable scale in iron smelting. The work is evidently a product of careful research into a particular instance of the important problem of the localization of industry, and as such it should be in every geographical library.

C. B. F.

Les Régions géographiques de la France.— Professor E. de Martonne. Paris: Flammarion. 1922. Pp. 190 (15 figures).

The professor of geography in the Sorbonne has written a rather quaint, very clever, and wholly delightful book, in language that even a child could not fail to understand. From the opening peep of Saint Louis surveying Paris from the towers of Notre Dame to the concluding hint—very nearly justified literally on pp. 166, 167—that the real importance of the Pyrenees lies in their influence on the plains to the *north* of them, it is a work of art; and as such it deserved much better treatment from its publisher than deplorable traditions encouraged him to give to it. This is all the more true because the book is the outcome of the series of lectures given in the Columbia University, and is essentially an appeal to foreigners.

The chapters do not cover literally the whole of the country, but nothing essential or typical has been omitted. The result is a most vivid and illuminating picture of all that is characteristic in the varied aspects and resources of France, especially as expressed in the human life. Thus, the Massif Central is presented in four studies of perfectly typical regions, from the simplest (Le Limousin) to the most complex (L'Auvergne). Everywhere, too, besides this watchful emphasis on the essential and the typical, there is a store of interesting details put in the most striking—and often a very amusing—way, *e.g.* the adaptability of the Picard, the fact that in Champagne wine does *not* represent the chief activity, the surprise of the almond fruiting in Alsace, the influence of "tourist" railways on the agriculture of Provence, the "stupid" choice of the site for the old port of Marseilles traced back to the desire of the Greeks to get—not easy access inland—but shelter from the mistral, the success of maize-growing in central Aquitaine connected with the similarity of the climate to that of the central Mississippi basin, the glimpse of Albi "endormi à l'ombre de son admirable cathédrale."

The parts of the book that refer to the War Zone are written with notable restraint. For instance, not one word is said about the deliberate destruction or theft of the textile machinery of the north-east, where in 1914 the French had some of the most perfect machines in the world, most of them "taken into use"—and subsequently "lost"—in Germany. One thrust only does he allow himself, and it is at once so legitimate and so lethal that it deserves

* The paper by Prof. Demangeon on the early French iron industry, noticed in the May number (p. 392), may be read with advantage in this connection.

quotation ; but, to taste it fully, one needs it in the original. "L'exploitation en avait été retardée par les Allemands, soucieux de réserver un quasi monopole aux sels de Thuringe. Elle va être développée pour le plus grand profit de l'agriculture française et de l'industrie alsacienne." At the end of each chapter there is a useful little bibliography, and the illustrations—if poorly printed—are as illuminating as the text. Nothing better of the kind is known to the reviewer ; indeed, it is an almost perfect example of a particular type of work in which French geographers are unrivalled—a vivid and explanatory setting of human life in all its terrestrial relations. L. W. LYDE.

ASIA

The Secrets of a Kuttite.— Captain E. O. Mousley. London : John Lane. 1921. Pp. 392. *Illustrations and Maps.* 8*s.* 6*d. net.*

This book gives the personal impressions of a gunner officer during part of the Mesopotamian campaign and as a prisoner of war in Turkey. He describes vividly the wonderful retirement of the Sixth Indian Division from Ctesiphon to Kut, when General Townshend successfully withdrew his shattered force, including his sick, his wounded, and his prisoners, and inflicted, into the bargain, heavy casualties on his pursuers. A long account of the author's experiences during the defence of Kut follows, and though no attempt is made to describe the military history of the siege a thrilling description is given of the life of the garrison. The philosophy of the British soldier there is summed up thus : "You are," says Townshend, "making history." "I would rather," thinks Tommy, "make some stew." A president of a British officers' mess, more cynical, served up as a second (and last) course at the extremely scanty mess dinner a dish containing a bradawl labelled "Not to be eaten ; may be used for making another hole in your belt." Less gifted with a sense of humour were the sepoys, who until the last fortnight of the siege steadfastly refused to eat horseflesh (the staple diet of the rest of the garrison), among their reasons being the plea that the signatures of their religious leaders' permission to eat it were not authentic, as they came from India by wireless !

When Kut fell Captain Mousley was taken with the other officers of the garrison to Kastamuni in Anatolia, and a year later to Constantinople. Some extracts from the Turkish commandant's orders at the former place, as translated by the Greek interpreter, are amusing :

"Officers cannot talk to any one except themselves, strong punishments will pursue swiftly. Surely they need not chivvy 'bints' in the bazaar, and officers educated in London could know better. When officers go for a walk in charge of a posta (soldier) they shall not go to the front or the posta gets behind, in which case the posta has orders to shoot or remonstrate with the culprit. It has been taken to my notice that English officers never stop kicking up a shindy in their rooms. Cards will be stopped. Let us not play cards or kick up any more shindy. You shall behave civilized. Officers will be always tidy the room. Why choose the pigstye? This is also a punishable affair. Officers are allowed the bath and bazaar and footer. Why not go about properly dressed? Surely no hat or in the hand is not properly dressed. Sticks are forbidden and officers cannot walk with sticks. It is forbidden to get drunk or sing, as the noise stops the sleep of neighbours. If a fire starts it goes. Therefore don't smoke in bedrooms for God sake. Let every one pay the price in the bazaar, and let them pay all their money to Usnu, who is not a robber." The last sentence referred to the messing contractor, for collusion with whom the commandant was eventually dismissed. A notable feature

of captivity at Kastamuni was the ease with which the British officers could cash cheques with the shopkeepers, who never presented them till after the Armistice! At Constantinople the most exciting part of the book begins, for here the author, after much suffering from the callous neglect to which all British prisoners in Turkey were subjected, managed to get immersed in the tangled web of Turkish diplomacy—a remarkable achievement for a prisoner of war, but quite typical of Constantinople during the last few months of the war. Captain Mousley made several attempts to escape, but escape was all but impossible.

This highly interesting book is perhaps overfull of the author's personality, but he disarms criticism by remarking that it was written in Kut and in captivity (when nobody's sense of proportion is at its best), and that he had been dissuaded by his friends from recasting it and so detracting from "whatever appeal it may have as a human document." E. H. K.

Recent Happenings in Persia.— **The Hon. J. M. Balfour.** Edinburgh and London: William Blackwood & Sons. 1922. Pp. 307. *Illustrations.* 21*s. net.*

Persia has indeed fallen on evil times, and it gives little pleasure to her friends to have this pointed out. Yet it is valuable to have a record of events that are happening, set down by a writer with inside knowledge. Mr. Balfour accompanied Mr. Armitage Smith, the late financial adviser, to Tehran, where he resided for over a year at a particularly interesting period. He evidently worked hard to study the Persian question, with the result that we are shown clearly the reason for British prestige having fallen from the high position it occupied after the Great War, to depths never reached, at any rate, in modern times. Four chapters are devoted to posting the reader in recent events, and here Mr. Balfour is not very successful, although much of his information is useful. But when he describes events which occurred after the Armistice and during the period of his residence at the capital, he becomes interesting, and his record will be of value to the historian. The hopelessness of reforms is well brought out, and the fact that Persia has no intention of living by her own exertions. It is this fact and the all-pervading corruption that constitute the root of the evil, for Persia, if poor, could nevertheless pay her way if the ruling class were honest. Indeed, that is the question. Will the Persian grandees imitate the nobles of Japan and resign privileges that are incompatible with the welfare of the country, or will they continue to rob their fellow-countrymen until the latter rise and massacre them?

Mr. Balfour realized that the Persians do not wish to have a competent financial adviser who will set things right by sweeping away abuses. Far from it, they wish for a man who will inspire sufficient confidence in Europe to enable a loan to be raised. That is the object of each new cabinet. Reforms are promised which require financial assistance to start them off. If the loan is raised, the ministers embezzle or waste the money, and every kind of interested opposition prevents the reforms taking shape. The position is serious, for anarchy has succeeded to the good order that was introduced by the South Persia Rifles, and the author is not exaggerating when he characterizes their disbandment as suicidal. Yet there is hope that the march of progress in the East will stimulate the people of Persia to set their historical country in order, and that the disinterested policy of Great Britain, who can never cease to be concerned for the welfare of an ancient state which borders on the Indian Empire, may, in time, be realized. The hour before dawn is the darkest. May Persia pass through it to a new era of progress and prosperity!

There are many good stories, which have the genuine ring about them. That of the Kermanis who started drilling to fight the Russians, but who refused to attack a band of local robbers on the ground that the Russians were far off, whereas the brigands were close by, is worthy of Hajji Baba.

The illustrations are somewhat mediocre. P. M. S.

AFRICA

Recollections of Adventures: Pioneering and Development in South Africa, 1850–1911.— H. W. Struben. Pp. vi. and 208. Cape Town: T. Maskew Miller; Oxford: Basil Blackwell. 1920. *Price* 18*s. net.*

The "recollections" of any man of ordinary intelligence whose knowledge of South Africa went back to 1850 would be of value. Mr. Struben was of much more than average intelligence; he was a man of unusual energy, determination, and grit, large-hearted and fearless, and he made an ideal pioneer. He had, too, the gift of writing as a man talks when overflowing with good things to say, and his recollections are therefore both valuable and entertaining. The son of a Dutchman who had married a Scotswoman and settled in England, he went with the family to Durban at the age of ten. The sixty-five years between his arrival in Natal and his death witnessed vast changes in South Africa, and for those changes no one was more responsible than Mr. Struben himself, for he and his brother Fred were the discoverers of the Witwatersrand goldfield. That the new world of industrialism which he thus evoked was not to his liking every reader of this fascinating record will readily understand. That he should sell out his mining property and retire to the quietude of the country was what might have been expected. It was in this evening of life that he wrote these recollections, in which he packed incidents enough to furnish forth a dozen books of adventures. For many years, in the days before railways, when not one river between Durban and the Limpopo was bridged, when the country swarmed with game and there were not half a dozen houses in Pretoria, Struben was a transport driver. He was also a farmer, a member of the Transvaal *Raad* before the first annexation, a friend of Joubert's, well acquainted with Paul Kruger and a victim of the Boer civil war—in which there was much commandeering and little bloodshed. Throughout Struben played a man's part manfully. To give an illustration: returning to the Transvaal after Majuba, he was at Heidelberg one night asked by the hotel-keeper if he would mind Aylward (the notorious Fenian and stirrer up of trouble on the diamond fields) being put up in the same room, as the house was full. "I said no, I didn't mind; I was fully armed and I could shoot him if necessary."

It is worth noting that Struben attributes in part the increasing desiccation of the high veld to the substitution of sheep for the game driven or killed off. "One-time rich grass and clover valleys are dry ditches, due to sheep and goats tramping footpaths from one water-hole to another, which in flood time they soon cut into deep dongas. The game, although in countless thousands, never cut up the pasturage like sheep do, and many parts of South Africa are becoming barren, as the water, instead of being stored as of yore, is run off in these dongas without benefiting the soil." F. R. C.

Exploration of Aïr: Out of the World North of Nigeria.— Angus Buchanan, M.C. London: John Murray. 1921. *Illustrations and Sketch-map.* Pp. xxiii. and 258. 16*s. net.*

Captain Buchanan appears to be the first man of British blood to have explored the country of Aïr, which is, as he puts it, "out of the world north of Nigeria."

Certainly it is outside the world of the British official in Nigeria, and even of the French official in Zinder, which neighbours Aïr on the south. Hitherto for scientific knowledge of the country we have been dependent on Barth, who was there in 1850, and on Foureau, who traversed it in 1899. It had been known generally that desiccation had increased and that the population had dwindled even since Foureau's visit; Captain Buchanan—who was in Aïr in 1920—depicts a country almost wholly desolate, with many ruins testifying to former habitations. (It may be noted that the author does not include the fairly fertile region of Damergu in Aïr.) He attributes the decay of Aïr partly to encroachment by sand and climatic changes, partly to the ravages of war and the pillage of raiders. He himself witnessed a raid, and helped to prevent the raiders from completing their intended work. These robbers had come from near Ghat, 500 miles away. The previous year (1919) Aïr had been raided by tribesmen from Cape Juby—some 1500 miles distant.

The author, whose story is charmingly told, was most successful in his object of investigating the fauna of the country. Barbary sheep and ostriches are the chief objects of the chase; the ostriches Captain Buchanan "hunted for twenty days and saw sixteen birds, but never fired a shot at any of them." He discovered new species or sub-species of the Barbary sheep, gazelle, caracal, fox, and other mammals, including a "fat-tailed mouse" from Kano, and many new birds, butterflies, and moths. His collection excited the admiration of the British Museum officials and has greatly enriched Lord Rothschild's museum at Tring; it was at Lord Rothschild's instance that the journey was made.

But the book is not a technical treatise, and its appeal lies in the vivid picture it presents of a strange land and strange people. To its readers Aïr will henceforth be a very real place—a country where the drama of life is enacted by people of like passions to their own. Even this remote, largely desert, land was involved in the great war. Tegama, the Sultan of Agades, was a party to the Turkish-German intrigues which led in 1916 to a rising against the French, and—on the defeat of the rebels—to the abolition of the Sultanate. We should have welcomed from Captain Buchanan a fuller account of this rebellion.

Probably the most lasting impression left by the author is of a land full of strange beauty but in decay—yet a decay not incurable. Agades lies on a caravan route never likely to become deserted, and reconstruction work could be done in Aïr well worth the doing. F. R. C.

AMERICA

Labrador.— William Brooks Cabot. London: Heath Cranton. 1922. Pp. 354. *Illustrations and Sketch-map.* 15*s. net.*

The publisher's announcement upon the wrapper of this book states that the author's experiences of Labrador "cover some twenty years of interior travel and thousands of miles of voyaging." These statements are a little difficult to reconcile with the information given by Mr. Cabot himself. His interest in the peninsula appears to have begun in 1899, during an expedition in northern Quebec, which brought him into contact with men who had accompanied Mr. Low on his well-known surveys. But his first visit to Labrador seems to have been paid in 1903, the year of the ill-fated Hubbard expedition, whose members Mr. Cabot fell in with during his journey to the coast. From this date he returned to the country every year up to 1908, and again in 1910, penetrating the interior repeatedly along the Indian portage route between the coast and the George River, by way of Frank's Brook, or, as he prefers to

call it, the Assiwaban River. This route Mr. Cabot eventually traversed in its entirety, reaching Indian House Lake at practically the same time as Mr. Hesketh Prichard, who arrived on its shores, some miles to the northward, by an independent line of his own choosing. The "thousands of miles" referred to apply therefore, for the most part, to a number of journeys in one comparatively restricted area. Mr. Cabot gives, in addition, some account of visits paid to the extreme south of the peninsula in 1913 and 1916.

These remarks involve no depreciation whatever of Mr. Cabot's performances, or of the valuable and instructive work in which he has described them. Even on the coast his exploits were sufficiently remarkable to give rise to exaggerated stories, which he is at pains modestly to correct; his experience of the country few could claim to rival, and his principal object was not so much exploration as the study of the Naskapi Indians, in which field, as all who are interested in Labrador know, he speaks with supreme authority. Mr. Cabot is evidently a bold and seasoned traveller, who has not infrequently run considerable risks, and has been dependent to a large extent upon his own resource and enterprise. For expeditions into the interior, as Mr. Cabot found, it is practically impossible to rely upon local assistance. The coast people's ignorance of the hinterland is only equalled by their dislike of it, and, as the summer cod-fishing provides an alternative source of income, the desertion of a confiding traveller entailed little or no financial loss to a cowardly or recalcitrant guide, while, since guides as a class are non-existent, there is no appreciable force of public opinion to condemn such conduct. Suspicion of a possible rival on the part of those who trade with the Indians also plays its part, and though Mr. Cabot managed, in face of considerable difficulty, to establish friendly relations with the Naskapi, there is evidence that the welcome which this people extended to him was exceptional, and that unaccredited strangers in the interior would not, as a rule, be allowed by them to pursue their way unmolested. In 1915, as we are informed in this volume, a party was actually ejected by the Indians.

Though study of the Naskapi was the author's main interest, his observations on the fauna, flora, and geology of the region traversed are shrewd and accurate; he has provided a sketch-map adding materially to the sum of geographical knowledge; and the numerous excellent photographs with which the book is illustrated, including pictures of living caribou and ptarmigan, help to make up a volume which is a most welcome addition to the literature dealing with the subject. G. M. G.-H.

POLAR REGIONS

The Friendly Arctic.— **Vilhjalmur Stefansson.** New York: The MacMillan Company. 1921. 30*s. net.*

Mr. Stefansson has already published a summary of the main work of the Canadian Arctic Expedition in the *Geographical Journal* for 1921, and it is therefore unnecessary here to do more than say in few words that it consisted of five seasons' exploratory work by the leader himself and of three seasons of topographical and other surveys by Dr. Anderson's Southern Unit. The story of the almost bewildering sequence of events is now set out in full, together with the author's beliefs and suggestions on how Arctic travel should be carried out in modern times. On the latter subject he is particularly well qualified to speak, for like Sir James Clark Ross and Sir Leopold McClintock he holds an unusually long record of polar travel—almost ten years. At the present day he may well be regarded as the man best qualified to speak on sledging in the

Canadian Arctic, just as Mr. Rasmussen may claim to speak on travel in Greenland.

The book itself consists of 700 pages, printed in somewhat smaller type than usual, and on that account may deter some possible readers. It would be a pity if this were so, for Mr. Stefansson's narrative is one of the most interesting that has been written on the Arctic, and is published in days when the output of English Arctic literature is far surpassed in volume by that dealing with the Antarctic. It is original in treatment, and it is quite frankly heterodox. The author throughout, as the title might indicate, is out to fight and if possible demolish the idea that the Arctic has either its discomforts or its dangers beyond the ordinary.

Mr. Stefansson has long held the view that one should be able to live in the Arctic almost entirely on the proceeds of hunting, on sea-ice as well as on land. In 1914 he put his convictions to the test, and with a few weeks' provisions made a three months' sledge journey at considerable risk across the moving pack of the Beaufort Sea from Martin Point in Alaska to Banks Island. The result was not only a triumph for originality, but it was also an effective silencer to Mr. Stefansson's numerous critics. Unfortunately some of the latter were to be numbered amongst members of the expedition itself, and the narrative tells how they not only criticized but in some cases actually opposed the wishes of their commander. In three cases orders were definitely disobeyed: whatever the motives may have been, the result in each case was to nullify much that the leader had intended, and seriously to cripple his well-laid plans. A man of less resource might have been completely baulked. The Canadian Government, however, are to be congratulated on having appointed a leader whose character was such that he resolutely proceeded with his programme after his main ship the *Karluk* was lost; and later, despite opposition and deficient outfit, actually succeeded in carrying out almost all that he had wished to do. How much more Mr. Stefansson would have accomplished had the *Karluk* and its valuable equipment not been lost can easily be imagined. That with improvised appliances and untrustworthy support he could accomplish as much as he did marks him out as a worthy successor to these other Canadian Arctic explorers, Rae and Simpson.

To those who know the Scott and Shackleton pictures the book would appear to be inadequately illustrated, but this was evidently the direct result of the loss of the *Karluk*. On the other hand, there is an excellent series of maps, on which can be traced the progress of the expedition from year to year, as the base was pushed northwards, new coastlines discovered, and old ones resurveyed. On this, as on most recent polar expeditions, there was no mid-winter monotony. During the winter sledging went on almost as usual, hunting was a necessity, and skins had to be prepared for clothing. No effort, however, is made to describe at length either the events of the winters or the incidents of sledging. Dates and distances, even, are very seldom mentioned. Instead of the mass of similar details which has made Antarctic travel books in many cases repetitions one of the other, here is a book where the writer continually digresses to describe Eskimo superstitions on one page, or perhaps to ruminate on another on the equally superstitious attitude of white men to unusual food. The comparison is all in favour of Mr. Stefansson's original methods; he has not only "spun a good yarn," but also provided a mine of Arctic lore. The book deserves to be very widely read.

The author is himself so frank in his criticisms of previous explorers that he will no doubt allow us to make two criticisms in our turn. Is his method

of "living on the land" really a paying one? A great deal of time has to be spent in hunting, and the traveller, moreover, has to be a first-class hunter. This involves two distinct disadvantages: on the one hand, a comparatively small proportion of the time is available for geographical exploration; on the other, the number of men suited for Arctic exploration on the Stefansson method would be extremely small, and would not include many explorers who have proved themselves in the first flight. The frequent references to Admiral Peary rather than to Amundsen, Scott, and Shackleton show that the author is not familiar with the greatly superior equipment and rations which have been evolved in the Antarctic. Would not their employment in the Arctic, considering the shortness of the exploring as distinct from the travelling season, be an improvement? "Living on the land" has still to justify itself as more economical in time or richer in results than the methods employed by McClintock on his great sledge journeys.

The second specific criticism is on the advisability of calling the Arctic "friendly." Friendly it may be in the height of summer, in a well-found ship or to an expert hunter armed with European weapons. The Eskimo themselves, however, are known to suffer frequent hardships, and the starvation of whole families is not uncommon. On this very expedition, moreover, whose record is now set forth under the title of 'The Friendly Arctic,' no less than sixteen men lost their lives in tragic circumstances, attributable in most cases to the rigours of Arctic exploration. J. M. W.

THE MONTHLY RECORD

EUROPE

The Tirso Reservoir Dam, Sardinia.

SARDINIA has felt to the full the serious consequences due to the irregular *régime* of the rivers in a land where the rainfall is concentrated into one season of the year, so that disastrous floods alternate with periods of drought which are fatal to agriculture, and also encourage malaria by the stagnation of surface waters which ensues. The only remedy, here as elsewhere, is the regulation of the water-supply by the formation of reservoirs to impound the ample supply of one season for use in the other. Tentative schemes have been on foot for a number of years, but have only lately borne fruit in a grandiose project for the creation of a lake 20 kilometres long on the middle course of the Tirso, the longest and most copious river of the island. This undertaking, now well advanced towards completion, is described and illustrated by photographs in the issue of *Le Vie d'Italia* for March 1922. To form the lake a gigantic dam 70 metres high is being constructed across the valley of the Tirso near Santa Chiara di Ula, mainly according to the plans of Signor Omodeo, but on the system of multiple arches suggested by Signor Luigi Kambo. This permits the installation within the dam itself of the powerful electric generators which will be capable of supplying power to the extent of 50 million kilowatts per annum. The lake reservoir, fed from a catchment area of 2100 square kilometres, will have a capacity of 416,000,000 cubic metres, and will supply water for irrigation to 30,000 hectares of land in the plain of Oristano, with a constant flow of 20,000 litres per second. At the same time disastrous floods will henceforth be impossible in the lower basin of the river. The power generated will first of all be distributed south-

ward to Cagliari and Portovesme and intermediate points, but it is proposed eventually to carry a supply to Arbatax on the east coast, and to Sassari and other places in the north-west. The valley in the neighbourhood of the dam has been converted during the building into a busy hive of workers. It will be necessary entirely to remove the village of Žuri, now on the right bank of the river, to a higher level, and its small but ancient church will be rebuilt in its original form. Apart from its agricultural potentialities, Sardinia possesses mineral wealth hitherto unexploited, and a new period of industrial development will, it is expected, be inaugurated by the execution of the project.

AFRICA

The Rainfall of South Africa.

Our knowledge of South African rainfall has hitherto been very imperfect, and a new series of maps and tables prepared by Mr. J. R. Sutton (*Trans. Roy. Soc. Sth. Africa*, vol. 9, Pt. 4, 1921) claims to be the most detailed and accurate representation of the mean annual and monthly distribution that has yet been made. Broadly speaking, South Africa is a region of summer rainfall, a fact due both to the annual southward migration of the equatorial rain-belt and to the moisture-laden monsoonal indraughts from the Indian Ocean as dominated by the south-east Trade system of circulation. The rainfall is predominantly of the convectional thunder type. The mean annual map shows the general trend of the isohyets in a north-and-south direction, so that whereas part of the west coast receives less than 1 inch, much of the east coast has over 40 inches. The wettest region shown is in the vicinity of the Shire Highlands, with 105 inches, where the conditions of the rainfall are very complex and little understood. It is pointed out that, though the eastern mountain ranges such as the Drakensberg and Zoupansberg increase the rainfall to over 60 inches, orographic influences play a relatively much less important part than in England, this being attributed to the thunderstorm character of South African rainfall, with little general wind and clouds higher than most of the mountains. The south-western corner of Cape Colony, with the Cape Peninsula, has the Mediterranean type of seasonal distribution, namely, a wet winter and dry summer, whilst farther east the southern extremity of the continent shows a complex seasonal variation due apparently to the interaction of the western winter with the eastern summer regimens. The very small well-watered area of the Cape Peninsula is owing to the relief of the land, but the local variations of rainfall are very remarkable, and greater than in any other region of equal size in South Africa, some places receiving considerably less than 20, others more than 40 inches. On the top of Table mountain near the eastern escarpment the annual average is locally, at Maclear's Beacon, as high as 90 inches. South Africa is a theatre of terrific thunderstorms, and would appear to suffer even more from hail than such badly affected European countries as Hungary, Italy, and France. An account is appended by Mr. Sutton of a storm which devastated parts of Rhodesia in December 1915 with hailstones attaining the size of cricket-balls, causing great mortality among live stock.

Swedish Scientific Expedition to the Lake Kivu Region.

A short account is given in *Ymer* (1921, Heft 3/4) of the scientific expedition organized by Prince William of Sweden for zoological research in the region of the Kirunga volcanoes, north of Lake Kivu. The expedition left Marseilles towards the end of 1920, landed at Mombasa, and passed through the Kenya colony and Uganda to its destination. Various camps were established among

the volcanoes and on the north shore of the lake, and extensive zoological collections made, including specimens of the mountain gorilla. Near the lake the barren lava-fields due to the sudden eruption of a new volcano in December 1912 were found to be but sparsely covered here and there by new vegetation. The expedition went north to the Belgian post of Ruchuru and Lake Edward, through a district described as a paradise for sportsmen. Passing rapidly through the Semliki valley, where interesting collections were made in the outliers of the great equatorial forest, it spent some time at the Belgian post of Isumu, and made some study of the Wambutti dwarfs. Thence the return was made by Lake Albert and the Nile. The collections, which have been deposited at the Natural History Museum at Stockholm, include about 1000 mammals, 1700 birds, and some hundreds of reptiles and amphibia, besides a large number of insects.

AMERICA

British Honduras: Proposals for Development.

The prosperity of British Honduras has hitherto depended almost entirely on its forest products, chiefly mahogany and chicle gum, the customs duties on which have been the mainstay of its revenue. But these resources are not inexhaustible, and more systematic development of agriculture in the colony (hitherto shifting and primitive, apart from the cultivation of coconuts and sugar-cane) is needed to put the economic conditions on a sounder footing. Mr. W. R. Dunlop, of the Imperial Department of Agriculture for the West Indies, spent six months in the colony in 1920, and the results of his studies were last year published on behalf of the government by the Crown Agents for the Colonies. The report begins with a useful sketch of the natural features of the colony, afterwards touching upon the economic conditions and prospects of industrial development. The climate is tropical to subtropical, the temperature on the coast ranging between 55° and 95° F., and though higher temperatures occur in the interior, the nights are usually cool. The prevalent easterly sea-breezes make the climate on the coast salubrious and pleasant as a whole, and although towards November "northers" occur—strong rather cold winds approaching to half a gale—the colony is not visited by hurricanes, nor is it subject to earthquakes or droughts. In the north the surface is generally level, with wet to swampy soil in places and periodically dry conditions in others; in the former the prevalent formation is clayey disintegrated limestone, in the latter (which include the so-called "pine-ridges") almost pure sand overlying Tertiary sandstone. Southwards the country becomes gradually hilly (the hills consisting of metamorphosed sandstone), and south of Deep river there are folded calcareous sandstones, giving rise to fertile rolling country with obvious potentialities for agriculture. The best and most accessible lands lie along the rivers which flow through deposits of alluvium but are separated by sandy ridges. The northern rivers are generally slow and deep with fairly direct courses, the southern fast-flowing, winding, and shallow. The most marked plant associations are: Evergreen rain forests with mahogany, ironwood, etc., and large numbers of Cohune palms; wet to swampy soil vegetation with gru-gru palm, rosewood, etc.; pine-belts of open park-like country; and savannahs and mangrove swamps near the coast. Reasons for the backward state of agriculture have been the large areas in the hands of relatively few owners, exploited merely for forest products, and the sparse population (about 4·5 to the square mile). It is composed of very varied elements, including (besides the original Maya inhabitants) creoles of mixed African descent, Spanish Indians from Yucatan, Caribs, East Indians (intro-

duced in the palmy sugar days), and people of Spanish, English or American descent. The staple industry of wood-cutting has never employed large numbers of hands, and besides the East Indians there are few efficient agriculturists. Education is more or less backward. The rivers are at present almost the only means of communication for a large part of the area, and efforts at agricultural development should be directed either to the lands near the coast, or to good lands in the interior which might be connected with the rivers by short roads or tramways, regard being had also to the presence of sufficient population. The lines on which it is thought that success might best be attained are (1) the expansion of the sugar industry; (2) food production (rice, Indian corn, vegetables, and fruit), the present supplies not even sufficing for the needs of the colony; (3) continuance of the banana industry in areas still free from the Panama disease; (4) cattle and hog raising, which is more suited to the present population of the interior than crop production. The organization of a Department of Agriculture is strongly urged.

AUSTRALASIA AND PACIFIC ISLANDS

Possibility of increasing Rainfall in South-East Australia.

Having regard to the particular climatic conditions of this portion of the continent, Mr. E. T. Quayle of the Commonwealth Meteorological Service thought it profitable to investigate the probable effect on rainfall of increasing the surface of evaporation, and the results are discussed in the *Proceedings of the Royal Society of Victoria* (vol. **33**, 1921), in a paper on the "Possibilities of Modifying Climate by Human Agency, with special application to South-Eastern Australia." Experiments on evaporation have shown that a grass or other vegetation surface may sometimes promote more active evaporation than a water surface, and the first object was to ascertain whether those areas which had been put under grass or cultivation in place of the drought-resisting Australian scrub showed any increase in the measured amounts of rainfall. Australian forest is so well armed against drought that, unlike the forests of moister regions, it contributes little or no moisture to the atmosphere by transpiration; but the case would be very different with growing crops, particularly when the plants transpire freely during the spring months. The rainfall records of certain selected regions for a long period were examined for two sets of spring months, viz. the true spring or equinoctial period September and October, and an extended spring period August to November. It was found that areas which had been cleared of Mallee scrub and given over to grass and crops indicated an increase in the spring rainfall of about 3 per cent. of the annual total, the effect being mostly confined to the shorter spring period, since by the end of November midsummer parching has already withered the grasses whilst the crops are nearly ripe. But better results might be expected from an extension of irrigation as a source of evaporation, and to test in some measure this hypothesis the rainfall records along the shores of such deep inlets as Spencer's Gulf and Port Phillip Bay were studied in relation to the prevailing winds and other factors. It is concluded that the narrow strip of water forming the northern part of Spencer Gulf is responsible for an increase of rainfall of 3 to 4 inches on the western side, and of 4 to 6 on the eastern, and that if the gulf were silted up its annual rainfall would probably be considerably under 9 inches. Equally striking results were attained for Port Phillip Bay. The extension of irrigation, therefore, along the Murray should have an appreciable effect in ameliorating the climate of northern Victoria, particularly if large reservoirs were made by impounding flood waters. It is

considered, moreover, that at least in the winter half of the year such an addition of moisture over the plains would, with westerly winds, intensify condensation in the form of wet mist, as well as actual rain, in the Australian Alps from which the irrrigation water ultimately comes, so that beneficial effects would accrue, as it were, at compound interest. It is pointed out that although by such human agencies the rainfall might not be increased by more than a few inches, the economic importance of every inch of annual rainfall is very great. Thus Hann has shown that in New South Wales a square mile of country carries 22 more sheep per annum with a 12-inch than a 11-inch rainfall, and that the rate of increase of carrying capacity increases with the rainfall, a 17-inch rainfall supporting 70 more sheep per square mile than a 16-inch rainfall. In view of these somewhat encouraging indications it may be recalled that the meteorologists who took part in the discussion of Prof. Schwarz's South African project (*Journal*, vol. 57, pp. 174 and 181) agreed in supposing that some increase of rainfall would follow the creation of a reservoir of the kind contemplated, supposing (which is quite another matter) that the scheme were feasible from an engineering standpoint.

POLAR REGIONS

Jan Mayen.

News has recently been received that the Norwegian Government has decided to continue the Wireless Weather Station established last summer on Jan Mayen by Engineer Ekerold. Mr. Ekerold's original wintering party of four men will accordingly be relieved some time this month. During the past winter the station has fully justified the hopes of its originators. The majority of the north-west gales off the coast of Norway have been forecasted, sometimes on reports coming from Jan Mayen only. Apart from this many false storm warnings have been prevented, as messages from the island indicated that storm-centres which had passed Iceland would nevertheless not reach Norway. The station has now been running without serious interruption since October 19. The only incident of note, apart from gales, was a powerful earthquake shock on April 8, which temporarily broke some of the connections.

Since the publication of Mr. Wordie's article on Jan Mayen in the *Geographical Journal* for March 1922, Dr. F. C. Wieder has been able to solve the problem of the map supposed to show the island as discovered in 1610. From his knowledge of the cartography of Spitsbergen and on other grounds Dr. Wieder can show that both Spitsbergen and Jan Mayen have been added to the copperplate about 1620; Cornelis Doetts, the publisher, has simply omitted to alter the earlier date on the original legend.

The Voyage of the "Quest."

News received early in May from South Georgia tells of the efforts made by Commander F. Wild, who succeeded to the command of the *Quest* after Sir Ernest Shackleton's death, to push south in Antarctic waters during the early weeks of 1922. Leith Harbour, in South Georgia, was left on January 15, the island being finally left three days later after a geological examination of Cooper Bay and Larsen Harbour had been made. The charted position of Clerke rocks to the south-east of South Georgia having been rectified, a survey was made of Zavodoski island in the Sandwich group, and the course continued to the east, navigation being rendered difficult by icebergs. In the position of the supposed Pagoda rock a depth of 2950 fathoms was obtained. Heavy pack was entered on February 4, in 65° 18′ S., 15° 23′ E., and progress became increasingly difficult until the furthest south was reached on February 12,

in 69° 18′ S., 17° 11′ 30″ E., when a rapid retreat became necessary to extricate the ship. Soundings here showed rapid shoaling indicating proximity of land. A second attempt to push south was stopped by impenetrable pack. A course was set for Ross's "appearance of land," and the ship was forced through several hundred miles of heavy pack, but was at last beset 35 miles from the position of Ross's supposed land. Under good conditions of visibility no signs of land could be seen, and as soundings of 2446 fathoms were obtained, the existence of land hereabout is not probable. After seven days a heavy northerly swell caused the pack to open, and the *Quest* was released after strenuous exertion. The expedition then made its way to Elephant island in the South Shetlands, the place of refuge of the crew of the *Endurance* after the loss of that ship during Shackleton's expedition of 1914–16, but a violent hurricane made it impossible to revisit Cape Wild. The exhaustion of the coal supply then made it necessary to return to South Georgia. Out of a total sailed of 6000 miles, 2800 had been through ice. Soundings had been carried out throughout, and magnetic, biological, geological, and meteorological observations made. After necessary repairs had been effected Commander Wild hoped to leave on April 18, bound for Cape Town by way of Tristan da Cunha, Nightingale and Gough islands.

MATHEMATICAL AND PHYSICAL GEOGRAPHY

The Sargasso Sea.

The mysterious glamour which formerly enshrouded the Sargasso Sea in mid-North Atlantic has been gradually dissipated by the more accurate and prosaic facts collected by modern navigators, the old stories of fields of weed so dense as to entirely obstruct the passage of ships having been shown to be more or less mythical. Some years ago we referred (*Journal*, vol. 37, p. 219) to Prof. Stevenson's observations, which showed that the weed occurred chiefly in lines and patches of no great extent, with clear water between them. This is confirmed by the observations made during a series of years by Capt. C. C. Dixon, whose search for reported islands in the South Pacific we lately referred to (*Journal*, vol. 59, p. 149). On each voyage across the area in question for about fifteen years, Capt. Dixon has made notes on the absence or presence, and density, of the weed, using a scale of ten terms to denote the degree of density. We believe that he is the first to have carried out a quantitative determination of the amount of weed present per nautical mile by means of a tow-net ; the "catch" obtained during a fixed interval of time being carefully weighed. He has sent us the results of such determinations made during a passage across the Sargasso Sea in September 1919. Towing a net with mouth 20 inches wide for two hours from a long outrigger over a distance of 6 nautical miles, Capt. Dixon caught 35 pounds of weed, which, after allowing for 7 per cent. of the time occupied by the several emptyings of the net, works out as just over 10 tons per square nautical mile. The position on this day (Sept. 21) was about lat. 39° N., long. 40° 20′ W. On the next day in lat. 40° 37 N., long. 44° 14′ W., the amount caught rose to 18 tons per square mile, the weed being then much more dense. On the 21st Capt. Dixon entered the note "weed quite thick," which, speaking from memory, he believes to be the sixth grade in his scale, the denser condition on the next day representing the eighth. Where the north-east trade-wind blows there is much less weed (the second or third grade of the scale), the greatest amounts being nearly always seen in calm weather, when it collects in "islands" several hundred yards in diameter, with clear water between them. Even such fields of weed offer practically no obstruction even to a row-boat, the

individual bunches barely touching, though the fields look solid from a distance. Were the fields composed of kelp, with its great vine-like growths up to 100 yards in length and interlaced to form a thick heavy mat, the case would be different. In every large patch of weed there is a collection of flotsam and jetsam, much of it with human associations, even though found 1000 miles from the nearest shore. Capt. Dixon has observed, *e.g.*, many worm-eaten timbers, cinders, bottles (though none with "messages"), sections of cork life-belts, etc., which offer much food for the imagination. To gain the true "local colour" of the region he had himself rowed to some distance from the ship on a dark clear night, the glassy sea reflecting myriads of stars. He gives a vivid description of the eerie feeling engendered by the sensation of resting on a thin glass film with a great void beneath, the nearest island of weed rising and falling in long low swells as if through the respiration of some gruesome monster lurking beneath. It will be noticed that the position in which Capt. Dixon's experiments were made was in about 40° N., whereas the Sargasso Sea is often shown some degrees further south, even south of 30°. It would seem desirable to know whether his observations have also extended to these latitudes.

GENERAL

Medal awarded to Sir Francis Younghusband.

The Council of the American Geographical Society of New York have awarded the Charles P. Daly Gold Medal of the Society to Lieut.-Colonel Sir Francis Younghusband, "for explorations in Northern India and Tibet, and for geographical publications on Asiatic and African borders of the Empire."

Funeral of Sir Ernest Shackleton.

A telegraphic despatch printed in the *Times* of May 4 gives an account of the funeral of Sir Ernest Shackleton in the remote southern island of South Georgia. The whaler *Woodville* arrived with the body on February 26, and the coffin was taken ashore on March 1. On landing, the funeral party was met by Mr. Jacobsen, manager at Grytviken, and the coffin was taken to the Lutheran church. The funeral ceremony took place on March 5, when the managers of the whaling stations, the magistrate, Mr. Binnie, and various officials of the Falkland Islands Government, and about one hundred men, assembled at the church, newly gathered flowers being placed on the coffin by the only woman present. After the first part of the service had been read by Mr. Binnie, the coffin was carried by six Shetlanders, ex-service men from Leith harbour whaling station, to the cemetery on the hillside where sailors have been buried since 1846. Here the British and Norwegian flags were flying at half-mast, and the conclusion of the service was read. The Norwegian funeral hymn was sung by the Norwegians present, partly at the church, partly at the cemetery, and the grave was marked by a simple wooden cross.

Geophysical Papers.

We are informed that the Council of the Royal Astronomical Society has decided to issue special supplements to the *Monthly Notices* containing papers of geophysical interest. Non-members of the Society who wish to receive these supplements are invited to apply as soon as possible to the Assistant Secretary, Royal Astronomical Society, Burlington House, London, W.1, stating whether they desire a regular supply. The price will depend on the

number and length of the papers printed, but will not for the present exceed 10*s.* per annum.

Friar Odoric.

In *T'oung Pao*, vol. 20, Nos. 3-4, the Rev. A. C. Moule gives an English translation of the short "Life" of this famous traveller, contained in the 'Chronicles of the General Ministers of the Order of Minor Friars' (printed for the first time in 1897), and discusses certain points in the chronology of the Friar's life and travels, than which, he says, nothing could be more vague. Yule, in his classic edition of Odoric's narrative given as the first item in 'Cathay,' considered the date of his death established as 14 January 1331, but was inclined to put his birth earlier than 1285 or 1286; the date commonly assigned to it. Mr. Moule gives no weight to the argument of a recent writer, Golubovich, which would place the date of birth in 1265, and thinks that it is still quite uncertain. The date and duration of the travels are also most uncertain. Yule placed the start somewhere between 1316 and 1318, while Cordier accepts the date as April of the latter year. These dates have also been attacked by Golubovich, who makes Oderic sail for the Holy Land in 1296, and again for the Far East in 1314. Here again Mr. Moule thinks his grounds for the belief are quite insufficient, resting merely on a statement made 120 years after Oderic's death that his missionary career had lasted 33 years. There seems no reason, with the present evidence, to start him on his travels before 1314. The date at which his narrative was dictated and written down at Padua may be accepted as May 1330, but Mr. Moule points out that the date of his death is not so securely established as has been thought, the various manuscripts differing as regards both the day of the month and the year. The preponderance is, however, in favour of the accepted date of 14 January 1331, and this is also supported by the statement in the 'Life' now printed that the death occurred on a Monday. Mr. Moule thinks that Yule was perhaps too quick to deny to Oderic the spirit and intention of a missionary. As to the trustworthiness of his narrative, there is no doubt that he saw most of the places he describes, though in many of his stories he may be merely repeating the tales commonly told to visitors.

OBITUARY

Dr. Henry Newton Dickson, C.B.E.

WE regret to record the death of Dr. Henry Newton Dickson, which occurred at Edinburgh on April 2. Born in 1866 at Edinburgh, Dickson studied at the university there, and, influenced by the teachings of Tait and Chrystal, turned his attention to the physical aspects of geography. Experience under John Murray in the *Challenger* Office, and under Buchan in connection with Ben Nevis Observatory, gave him experience in meteorological and oceanographical research. In 1891 he was working at the Plymouth Marine Biological station on an investigation of the salinity and temperature of the waters of the English Channel, a piece of research that later was extended to embrace the whole North Atlantic. It was published in 1901 in the *Philosophical Transactions* of the Royal Society, and obtained for Dickson the degree of D.Sc. at Oxford. A later piece of research, which was not completed, dealt with the underground water in the chalk of the London basin.

Dickson was one of the pioneers in reformed geographical teaching in this country. In 1899, when the University and the Royal Geographical Society established the Oxford School of Geography under the direction of Mr. (later Sir) H. J. Mackinder, Dickson became lecturer in physical geography, and later undertook surveying in addition. In 1906 he became professor of geography in University College, Reading. This position he held until his resignation in 1920. In 1915 he was asked to organize a geographical section of the Naval Intelligence Department of the Admiralty, and remained its head until it was disbanded in 1919. Beginning in a small way this department grew so rapidly that in 1916 the accommodation afforded by this Society in Lowther Lodge was too small and new quarters had to be found, first in Hertford House and later in Berkeley Square. Dickson built up an organization which was constantly consulted not only by the Admiralty but by the War Office, Foreign Office, Colonial Office, and other departments of the State. It was the pride of I.D. 32 that there was no corner of the known world about which it failed on demand to produce information at the shortest notice. Under Dickson's direction and editorship the department also issued a series of handbooks on parts of the world where operations were in progress or in contemplation. Some of these volumes have since been issued to the public, but others have not been put on sale. Some of the volumes included new maps. Into the work of the Naval Intelligence Department Dickson threw himself with his wonted energy, working without cessation and allowing himself practically no leave from year to year. Undoubtedly the strain told on his health. For his services in the Admiralty Dickson was made a C.B.E. Resigning his chair at Reading Dickson settled in London in 1920, and became assistant editor of the supplementary volumes of the *Encyclopædia Britannica* (12th edition). Among his published works are 'Elementary Meteorology' (1893); 'Climate and Weather' (1912), an illuminating volume in the Home University Library; and 'Maps and Map Reading' (1912). From 1911–12 he was President of the Royal Meteorological Society, in 1913 he was president of the geographical section of the British Association, and for a period he served on the Council of this Society.

Dickson's services to geography were great, and not least in his insistence on a sound physical basis for the science. His work was marked by thoroughness in detail no less than by width of outlook. He looked for a high standard of work, and was impatient of any carelessness or unsubstantiated statements. To his students and assistants alike he was a real inspiration and will be sadly missed.

R. N. R. B.

CORRESPONDENCE

Archæology of the Ordnance Survey Maps.

WITH reference to the comments of Sir Charles Close on my remarks on the importance of the correct rendering of place-names on the Ordnance Survey Maps, I should like to say that no one has a greater admiration than I have of the excellent work of the Survey, which compares more than favourably with that of similar productions in foreign countries. But I am anxious to see that in questions of nomenclature it has every assistance from philological and historical experts. Where there are two names current for the same object, one sanctioned by the usage of centuries and the other a late introduction, there ought to be no question as to which should be preferred. With regard

to the use of Sanda and Wooda *versus* Sandy and Woody, the former are approved by all Devonians with any local knowledge, and the latter owe their introduction only to the summer visitor. As to the position of Sanda or Sandy Bay I have just had the opportunity of consulting two of the oldest residents of Combe Martin, and they agree that it is the bay immediately east of David's Stone, which is reached by Sandaway Lane. The bay called Sandy Bay in the Ordnance Maps is apparently known locally as Oakestor Bay. As a matter of fact, neither the one nor the other can at the present time be described as "sandy."

I do not suggest that the field names should be inserted even in the 25-inch maps, much less in the 6-inch, but I hope that they could be included without excessive expense in a list of the acreages of the plots numbered in the 25-inch maps.

Yours faithfully,
JOHN W. EVANS.

8 May, 1922.

MEETINGS: ROYAL GEOGRAPHICAL SOCIETY: SESSION 1921-1922

Twelfth Evening Meeting, 25 April 1922, at the Queen's Hall.—The President in the Chair.

ELECTIONS.—Jacobus Korthals-Altes; John David Anderton; Edward Guy Bryan; Paul Agius-Catania; Ralph Dawson; Major H. R. P. Dickson, C.I.E.; William Robert Easton; John George Finlayson, M.A.; Mrs. Edward Manico Gull; Arthur Howe; Miss Eveline M. Lawson; G. T. M. MacBryan; Mrs. H. G. Mainwaring; Captain A. G. H. Mayhew, R.E.; Charles H. Merz; Ira Thomas Mitchell; M. Morris; Edmond de Montaigne, Vicomte de Poncins; Mrs. Edith E. Pilling; Harold B. Reddick; Captain J. R. Chidlaw-Roberts, M.C.; John Frank Snaith; G. B. Stooke; Leonard C. Wrathall.

PAPER: The Mount Everest Country and People. Lieut.-Colonel Howard-Bury, D.S.O.

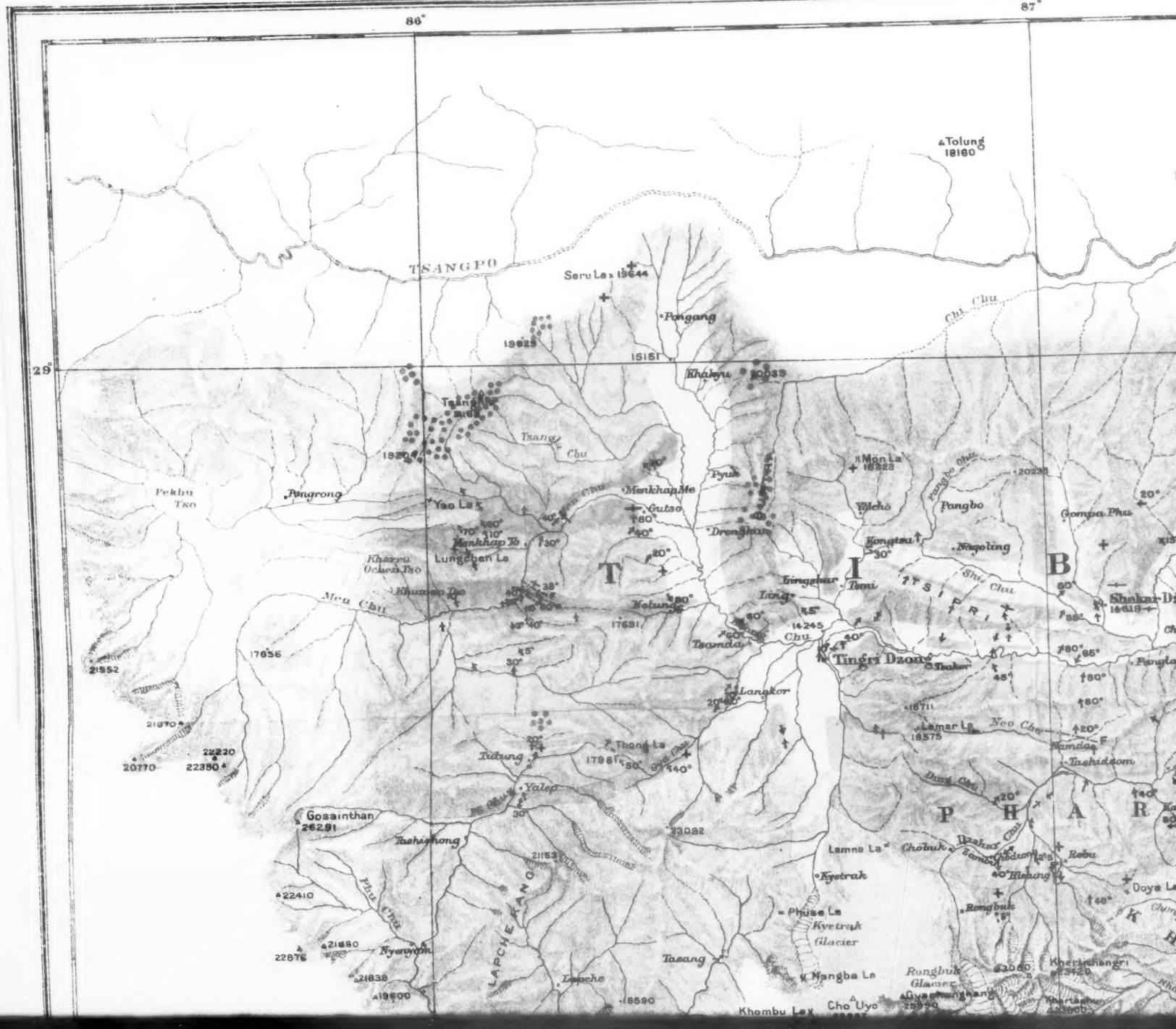
Thirteenth Evening Meeting, 8 May 1922.—The President in the Chair.

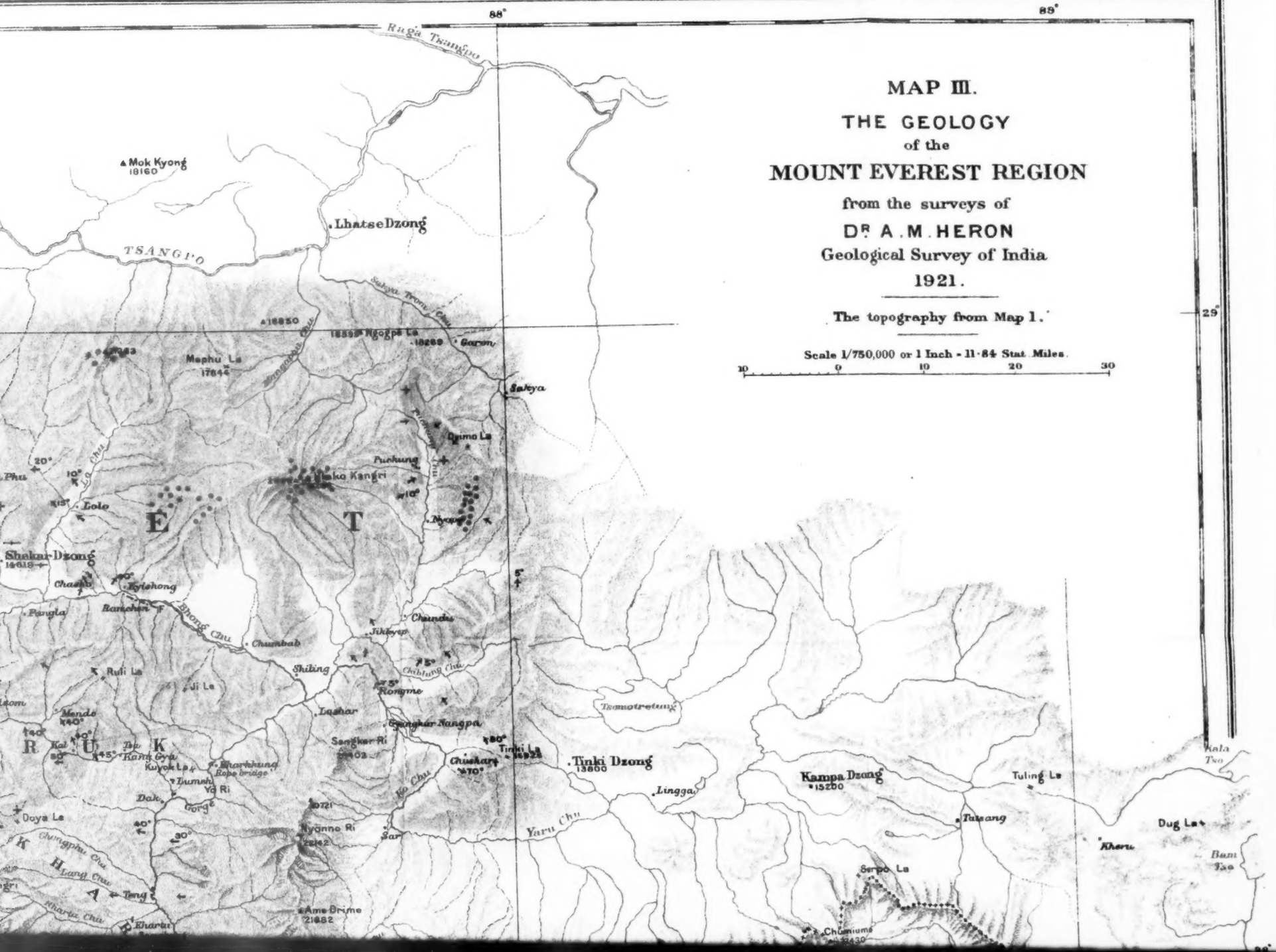
ELECTIONS.—Fred J. Alcock, PH.D.; Rowland Arnison, F.R.MET.SOC.; T. R. N. Cama; Mrs. T. R. N. Cama; A. N. L. Cater; Gerald Christy; J. W. Fairlie; J. L. Wilson-Goode; Miss Olive M. Johns, B.A.; Frederick Johnson; Edward John Stanley Lay; Prof. Archibald Montgomery Low; G. Laird MacGregor; Thomas G. Mellors; Captain Charles John Morris; E. Somerville Murray; Major R. W. Oldfield, D.S.O., M.C., R.F.A.; Lady Pinhey; Captain J. H. Rigg; Stafford I. Sassoon; Major Guy Herbert Straker, M.C.; George K. Thornhill; Lieut. Cyril Jennings White, M.C., R.F.A.; Mrs. Hilda Batty Woolley, B.A.

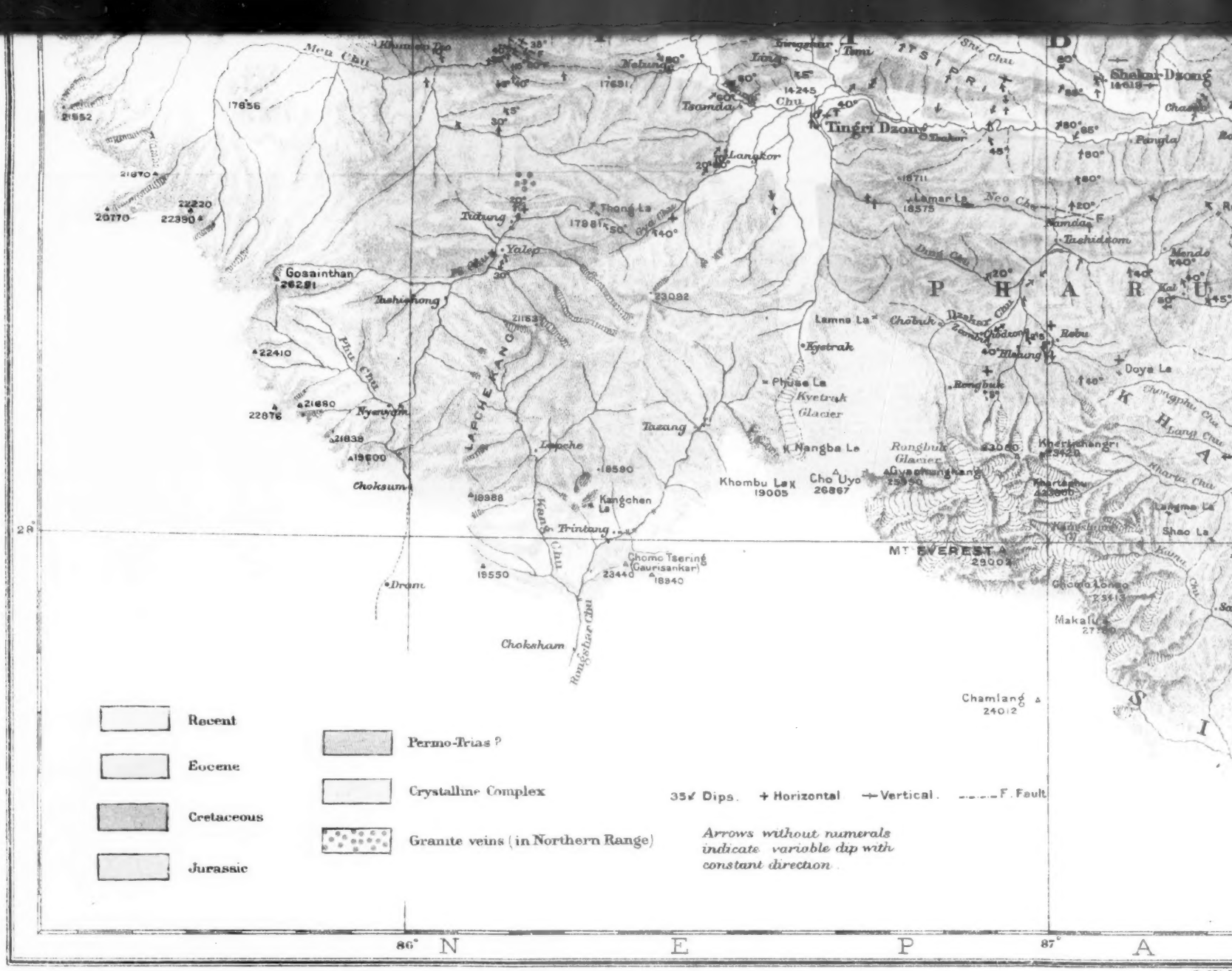
PAPER: The Klagenfurt Plebiscite. Roland Bryce.

Seventh Afternoon Meeting, 15 May 1922.—The President in the Chair.

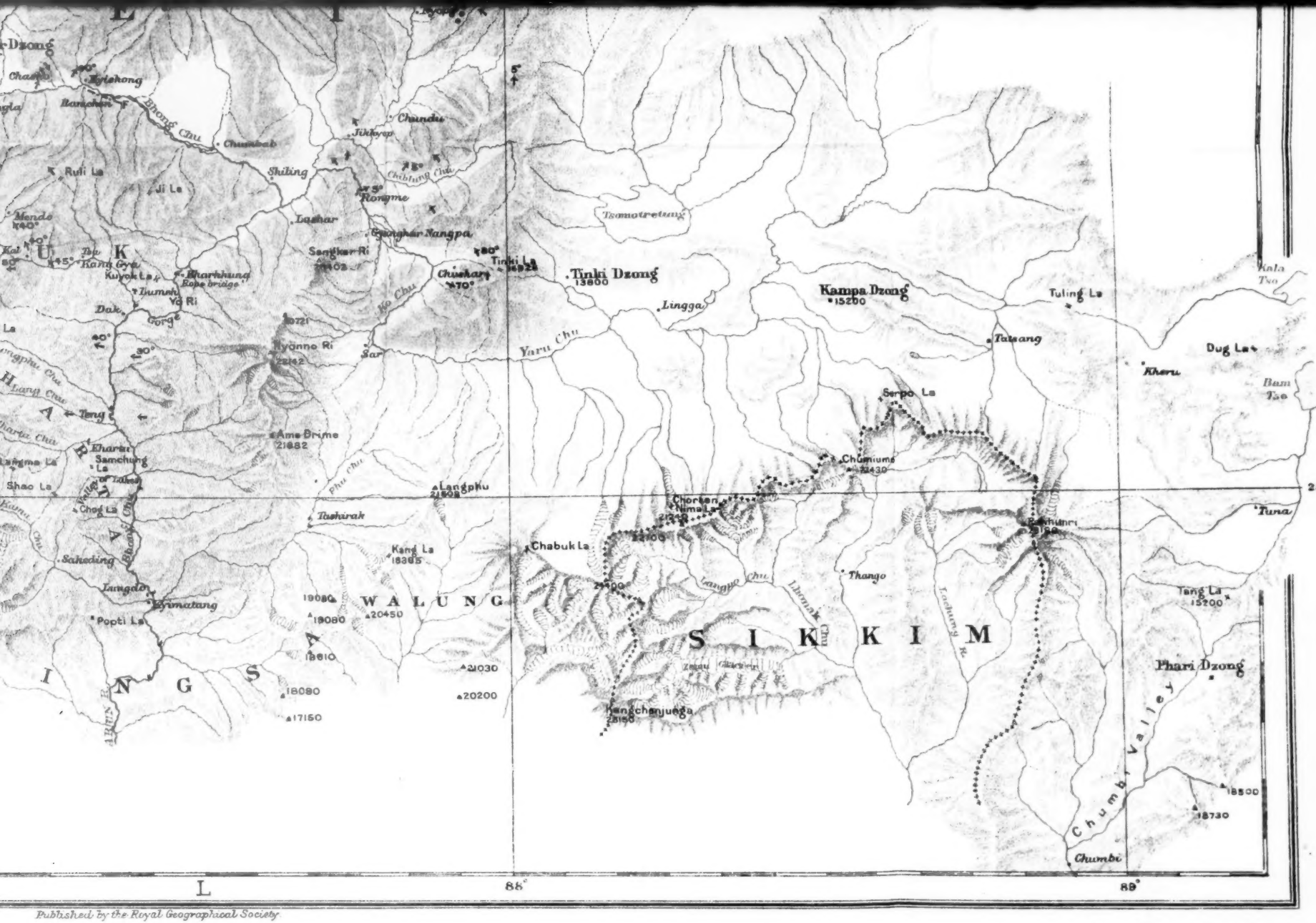
PAPER: The Evidence of a True North and South Directive Force in the Atmosphere. E. A. Reeves.


86°
87°
29°
TSANGPO
Tolung 18160
Seru La 19644
Pangang
19623
15151
Khâkyu 20033
Chu Chu
Tsang Chu
Pekhu Tso
Pongrong
Yao La
Menkhap Tso
Lungchen La
Khazru
Ochen Tso
Khumpa Tso
Meru Chu
Menkhap Me
Gutso
Dronghaur
Pyuk
Nelung
17631
17656
21952
21870
20770
22220
22380
Tsonda
Chu
Tingri Dzong
Thakor
Langkor
Lamar La 18575
Neo Chu
Tashidzom
Tutung
Thong La 17981
Yalep
Gosainthan 26291
Tashichong
23092
21153
Lamna La
Kyetrak
Phuse La
Kyetrak Glacier
Rongbuk
Rongbuk Glacier
Nangba La
Tasang
Lapche
18590
Khombu La
Cho Uyo
Nyanyam
21838
19600
22410
22876
21880
LAPCHE KANG
Pau Chu
Pangbo Chu
Pangbo
Yelchô
Gompa Phu
Nagoling
Tsechar
Tsoni
Shar Chu
Shekar-Dz
14618
Lamda
Dzakar
Chobuk
Rabu
Hlalung
Doya La
Khartsehangri
23420
TIBET
PHARKHA


88°
89°
29°
Ruga Tsangpo
Mok Kyong
18160
Lhatse Dzong
TSANG PO
Sakya Tromo Chu
18330
18552
Ngogpa La
18289
Garom
Maphu La
17644
Sakya
Dzima La
Pushung
Pushung Chu
Phu
Lolo
Myang
Shakar Dzong
14618
Chashi
Tsetshong
Pangla
Ranchen
Bhong Chu
Chumbab
Chundu
Jikkyap
Shiling
Chiblung Chu
Ruli La
Ji La
Rongme
Mende
Lashar
Gyangkar Nangpa
Tsamotretung
Sangker Ri
22402
Tinki La
15921
Tinki Dzong
13800
Chushar
Kampa Dzong
15200
Tuling La
Lingga
Tulsang
Dug La
Kharu
Bum Tso
Kala Tso
Kyu Chu
Yaru Chu
Dak
Gorge
Doya La
Lumnh
Yo Ri
Kuyok La
Kharkhung
Rope bridge
Kyanno Ri
22342
Sar
Serpo La
Chumiums
Chungphu Chu
Hlung Chu
Teng
Ame Drime
21882
Kharta
Khartse Chu
MAP III.
THE GEOLOGY
of the
MOUNT EVEREST REGION
from the surveys of
DR A. M. HERON
Geological Survey of India
1921.
The topography from Map 1.
Scale 1/750,000 or 1 Inch = 11·84 Stat. Miles.
10 0 10 20 30


Recent
Eocene
Cretaceous
Jurassic
Permo-Trias ?
Crystalline Complex
Granite veins (in Northern Range)
35° Dips. + Horizontal —+— Vertical. F. Fault
Arrows without numerals indicate variable dip with constant direction.
86° N E P 87°
28°
Mt. EVEREST 29002
Kangchen La
Khombu La 19005
Cho Uyo 26867
Nangba La
Lamna La
Phuse La
Kyetrak Glacier
Ronghuk Glacier
Lamar La 18575
Tingri Dzong
Shekar-Dzong
Tashidzom
Doya La
Shao La
Chamlang 24012
Makalu 27790
Gosainthan 26291
Choksum
Chokshang
Trintang
Tsamda
Langkor
Yalep
Tsang
Lapche
Nyenyam
Dram
Phu Chu
Arun
Sun Kosi
Tamur
Kharta Chu
Lamna Chu
Neo Chu
Pangla
Mende
Rebu
Kharta
Langma La

Publish



Published by the Royal Geographical Society

Mt EVEREST EXPEDITION.

Map III, Geology.

PERMANENT COMMITTEE ON GEOGRAPHICAL NAMES FOR BRITISH OFFICIAL USE.

FIRST LIST OF NAMES IN TANGANYIKA TERRITORY.

Published for the Permanent Committee on Geographical Names by the Royal Geographical Society, Kensington Gore, London, S.W.7.

PRICE SIXPENCE.

THE following List of Names in Tanganyika Territory, having been submitted through H.M. Secretary of State for the Colonies to the Governor and revised by the District Political Officers, is now published by the Permanent Committee on Geographical Names for British Official Use.

The List has also been submitted to experienced members of the Universities Mission to Central Africa and the Church Missionary Society. The Committee desire to acknowledge many valuable suggestions from Archdeacon H. W. Woodward, Rev. W. V. Lucas of the U.M.C.A., and Dr. E. J. Baxter, Rev. H. Cole, Rev. E. W. Doulton, Mr. A. J. Swann of the C.M.S., and especially wish to thank Rev. C. C. Child for his kind offices in procuring the assistance of these authorities.

The Committee are also indebted to Sir H. H. Johnston for a general revision of the List.

EDWARD GLEICHEN, Maj.-Gen.,
Chairman, P.C.G.N.

ROYAL GEOGRAPHICAL SOCIETY,
Kensington Gore,
London, S.W.7.

February, 1922.

ABBREVIATIONS, ETC.

alt.	alternative.	loc.	locally.
Ar.	Arabic.	mt.	mountain.
conv.	conventional.	pr.	pronounced.
dist.	district.	prop.	properly.
isld.	island.	riv.	river.
km.	kilometres.		

The pronunciations are in accordance with the R.G.S. II. System, for which see *Geog. Jour.* Jan. 1921, Vol. lvii. pp. 40–43; or an explanatory leaflet can be had on application to the Royal Geographical Society.

The acute accent ′ indicates the stress. Where the stress is not indicated, it is presumed to fall on the penultimate syllable.

FIRST LIST OF NAMES IN TANGANYIKA TERRITORY.

BUKOBA DISTRICT.

Biharamulo : 155 km. s. Bukoba : (not Biaramulo, Usuwi).
Bumbire : isld., 35 km. s. Bukoba : alt. Bumbide : (not Bumbireh).
Burigi : lake, 100 km. s.w. Bukoba : alt. Lueru lo Urigi : (not Birigi).
Buyangu : 30 km. N.W. Bukoba : (not Buyanga, Bujangu).
Buzirayombo : 160 km. s. Bukoba : (not Busirayombo, Busirajombo, Bushirayombo).
Bwanga : 180 km. s. Bukoba : alt. Bwanga kwa Matamba : (not Wanga).
Kanyonza : 150 km. w. Bukoba : (not Kanyonsa, Kanjonsa, Kangonsa).
Kaseke : 160 km. s.w. Bukoba : (not Kasseke).
Kasingaine : riv. Bukoba Dist. : (not Kazingeyne, Kasingeyne, Kasingejne, Kassingeine).
Keza : 200 km. s.w. Bukoba : (not Kesa).
Kiziramuyaga : 95 km. s. Bukoba : alt. Kiziramuyaga kwa Kajuma, Katembe : (not Kissiramiaga-kwa-Kadjuma, Kisiramiaga, Kiziramiaga, Kijira Miaga, Kadjuma).
Luvumbo : 60 km. s. Bukoba : alt. Luvumbo kwa Nyeruamba : (not Luwumbo, Luwungu, Njeruamba's).
Maisome : isld., 110 km. s. Bukoba : (not Maissome, Meissome).
Mugesera : lake, 175 km. s.w. Bukoba : (not Mugessera).
Nyamirembe : 135 km. s. Bukoba : (not Niemirembe, Namirembe).
Nyarubungo : 155 km. s. Bukoba : (not Njaruwungo, Nyarawungo, Biharamulo q.v., Usuwi).
Nyatakara : 200 km. s. Bukoba : (not Njatakara, Friedberg, Usambiro).
Nzaza : 180 km. s.w. Bukoba : (not Nsasa).
Rubabu : cape, 40 km. N. Bukoba : alt. Bugabu, Kagegi.
Rubya : 55 km. s.w. Bukoba : (not Rubja).
Rusera : 150 km. s.w. Bukoba : (not Russera).
Rusubi : locality, Bukoba Dist. : (not Usuwi, Usuvi, Ussuwi).
Ruvuvu : riv. Bukoba Dist. : (not Ruwuwu).
Ruwondo : isld., 100 km. s. Bukoba : alt. Luwondo : (not Ruvondo).
Rwavigimba : 210 km. s.w. Bukoba : (not Yavigimba, Jawigimba's).
Weranyanye : 105 km. s.w. Bukoba : (not Veranyanye, Weranjanje, Weranjange).

MWANZA DISTRICT.

Buchuru : 145 km. N.E. Mwanza : (not Butschuru, Bukhuru).
Bugisha : 35 km. s. Mwanza : (not Bugischa).
Buyombe : 70 km. s.w. Mwanza : (not Bujombe).
Ermesa : 25 km. E. Ikoma : (not Ermessa).

Handajega: 135 km. E. Mwanza: alt. Amayoka: (not Handayega, Amajoka).
Jojiro: 70 km. S.E. Mwanza: (not Dyodyiro, Djodjiro).
Kagehi: 30 km. N.E. Mwanza: (not Kageyi, Kahegi).
Kazadi: 65 km. S. Mwanza: (not Kasadi, Kazodi, Kasodi).
Kizaka: 45 km. S.E. Ikoma: (not Kisaka).
Kyafuma: 65 km. S.W. Mwanza: alt. Kyafuma kwa Makolo: (not Kjafuma-kwa-Makolo).
Lovire: 70 km. S. Mwanza: alt. Lovire kwa Sekimayu: (not Sekimayu, Lowire-kwa-Ssekimaju, Lowire-kwa-Makolo).
Lugundiga: 175 km. S.E. Mwanza: (not Dugundega, Meatu).
Majita: 90 km. N.E. Mwanza: (not Madjita).
Manyanya: 90 km. E. Mwanza: (not Manjanja).
Masanga: 95 km. S.E. Mwanza: alt. Kuru: (not Mazanga, Zengerema).
Mbushi: riv. S. Mwanza Dist.: (not Mbuzi, Mbusi).
Mbuza: 35 km. W. Ikoma: (not Mbusa).
Mumusi: riv. 130 km. N.E. Mwanza: (not Mumussi, Washani, Grumeti).
Murichunda: riv. 20 km. W. Mwanza: (not Muritshunda, Muritschunda).
Musoma: 150 km. N.E. Mwanza: (not Muzoma, Mazama, Misoma).
Mwanza: town and dist.: (not Mwansa, Muanza, Muansa).
Nasio: 60 km. N. Mwanza: alt. Bukaba: (not Nanzore, Nansore, Mkaka's).
Ndasekera: mt., 120 km. E. Ikoma: (not Ndasegera, Ndassekera).
Nyakasasa: 85 km. S.W. Mwanza: (not Nyakassassa, Njakassassa).
Nyanguge: 35 km. E. Mwanza: (not Yanguge, Yanguje, Janguge).
Nyaruzo: 220 km. N.E. Mwanza: (not Nyaruso, Njaruso).
Nyavangi: 150 km. N.E. Mwanza: (not Niawangi, Njawangi, Njawange).
Olgos: 70 km. E. Ikoma: (not Olgoss).
Oyondo: mt., 110 km. E. Ikoma: (not Ojondo, Oljiondo).
Serengeti: steppe, E. Mwanza Dist.: (not Zerengeti).
Shanwa: 115 km. S.E. Mwanza: (not Shanoa, Schanoa, Magala, Magalla).
Shimiyu: pr. Shímiyu: 65 km. E. Mwanza: (not Ssimiju, Ssimyu, Simiyu).
Shirati: 200 km. N.E. Mwanza: not Schirati).
Somanda: 125 km. E. Mwanza: (not Zomanda).
Ulima: 75 km. E. Mwanza: alt. Nassa.
Usambiro: 115 km. S.W. Mwanza: (not Ussambiro).
Ushashi: locality, Mwanza Dist.: alt. Washashi: (not Uschaschi, Waschaschi, Shashi).
Usukuma: locality, Mwanza Dist.: (not Ussukuma).
Uzinza: locality, Mwanza Dist.: (not Uzinja, Usinja, Usindya, Usindscha).
Vulavuye: 80 km. E. Mwanza: (not Wulawuje).
Zeleya: 145 km. E. Mwanza: (not Zeleia, Seleia, Seleja).
Zemu: riv. S. Mwanza Dist.: (not Semu).
Zimbiti: riv. S. Mwanza Dist.: alt. Zibiti: (not Simbiti, Sibiti).
Ziriga: 15 km. N. Ikoma: (not Siriga).

ARUSHA DISTRICT.

Arusha: town and dist.: (not Aruscha).
Bwokhota: 165 km. N.W. Arusha: alt. Sonyo: (not Bwochota, Ssonjo, Saleh Sonyo).
Dungobesh: 165 km. S.W. Arusha: (not Dungobesch, Dungobösch, Mausa's, Maussa's).
Esimingor: mt., 70 km. W. Arusha: (not Essimingor).
Eyasi: lake, Arusha Dist.; alt. Nyaraza: (not Eyassi, Ejassi, Nyarasa, Njarasa).
Gelai: mt., 105 km. N.W. Arusha: (not Gelei).
Isara: 140 km. S.W. Arusha: (not Issara, Ishara, Neu-Trier).
Ketumbaine: mt., 75 km. N.W. Arusha: (not Ketumbeine, Kitumbi).
Leganga: 15 km. E. Arusha: (not Leudorf).
Lo-olmalasin: pr. Lo-olmálasin: mt., 100 km. N.W. Arusha: (not Loolmalassin, Olmalassin).
Madukani: 115 km. S.W. Arusha: (not Köthersheim, Umbugwe).
Manyara; lake, 90 km. W. Arusha: alt. Lawa ya Mweri: (not Manjara, Lawa-ja-Mweri).
Mbulu: 140 km. S.W. Arusha: alt. Mburu: (not Umbulu, Burru, Iraku).
Ollekotisho: pr. Ol-le-kótisho: 40 km. S.E. Arusha: (not Loikotischo's).
Saburo: 35 km. S.W. Arusha: (not Ssaburo's).
Sambu: mt., 160 km. N.W. Arusha: (not Ssambu).
Yaida: valley, 150–200 km. S.W. Arusha: (not Jaida, Hohenlohe-Graben).

MOSHI DISTRICT.

Arusha Chini: 35 km. S. Moshi (not Aruscha-Tschini, Unter-Aruscha).
Kilimanjaro: pr. Kilima-njáro: mt., Moshi Dist.: (not Kilimandscharo).
Lembeni; 60 km. S.E. Moshi: (not Lembini).
Machame: 25 km. N.W. Moshi: (not Majame, Madschame).
Moshi: town and dist.: (not Moschi).
Same: 90 km. S.E. Moshi: (not Zame, Ssame).
Shigatini: 50 km. S.E. Moshi: (not Schigatini).
Shira: 35 km. N.W. Moshi: (not Schira).

UJIJI DISTRICT.

Kalinzi: 35 km. N. Ujiji: (not Nkalinzi, Nkalinsi, Lussimbi's).
Kasulo: 65 km. N.E. Ujiji: alt. Kasulu: (not Kassulo).
Kivumba: 115 km. N.E. Ujiji: (not Kiwumba).
Luasa: 65 km. N.E. Ujiji: (not Luassa, Lwasa's).
Lugufu: riv. 55 km. E. Ujiji: (not Luguwu).
Mkigonero: 65 km. S.E. Ujiji: (not Mkigonere, Kigonero, Mtau's).
Mlagarasi; riv. Ujiji Dist.: (not Mlagarassi).
Mruvila: 25 km. E. Ujiji: (not Mruwila, Kabeha's).
Msimbili: 50 km. S.E. Ujiji: (not Mssimbili, Mkuta's).

Nguruka: 155 km. E. Ujiji: (not Nguruku).
Nyamaliza: 180 km. N.E. Ujiji: (not Nyamalisa's, Njamalisa).
Nzai: 100 km. N.E. Ujiji: (not Nzei, Nsei).
Ruchugi: riv. 85 km. E. Ujiji: (not Rutschugi).
Ruchugi: 85 km. E. of Ujiji: (not Rutschugi Post, Uvinza q.v.).
Ujiji: town and dist.: (not Udjidji).
Uvinza: locality, Ujiji Dist.: (not Uwinsa).

TABORA DISTRICT.

Bulele: riv., 240 km. N.W. Tabora: alt. Mrere, Mugera: (not Bulere).
Dembezi: 100 km. N.E. Tabora: (not Dembesi, Usongo q.v.).
Gombe: riv., Tabora Dist.: alt. Igombe.
Gombe: 100 km. S.E. Tabora: alt. Ikulu kwa Kanyanka: (not Kanjanka, Muhalule's).
Igalula: 70 km. S. Tabora: (not Igarula, Kalula).
Igoveko: 55 km. S.E. Tabora: (not Goveko, Goweko).
Itumba: 120 km. N.W. Tabora: alt. Itumba kwa Mvumbi: (not Tumba-kwa-Mwumbi, Mwumbi's).
Iwelelo: 125 km. E. Tabora: (not Iwalero, Ivalero, Ivalaro).
Iwembere: pr. Iwémbere: riv. and steppe, E. Tabora Dist.: (not Wembere, Wembäre, Vembere, Vembaere).
Iwosya: 120 km. N. Tabora: (not Ivozya, Ivosja, Iwosja).
Izikisia: pr. Izikísia: 40 km. N.E. Tabora: (not Isikisia, Isikisja).
Izumba: 180 km. S.E. Tabora: (not Isumba).
Kagozi: riv., 170 km. N.W. Tabora: (not Kagosi).
Kasanga: 170 km. N.W. Tabora: alt. Kasanga kwa Lukambwa: (not Kazanga, Kansanga-kwa-Lukambua, Lukambwa's, Lukambua's).
Kawazu: 100 km. N.E. Tabora: (not Kavasu's, Kawasu's).
Kayuwa: 95 km. W. Tabora: (not Kaliuva, Kaliuwa).
Kilogansha: pr. Kilógansha: 125 km. N.W. Tabora: (not Kirogasia, Kirogassia's, Mariental).
Kinenaguri: pr. Kinénaguri: 150 km. W. Tabora: alt. Kinenaguri kwa Mfopola: (not Kinenagure, Mfopola's).
Luwanga: riv., 150 km. W. Tabora: (not Luanga, Lwanga).
Luwona: riv., 100 km. S. Tabora: alt. Wulua: (not Luona, Lwona).
Mabama: 35 km. W. Tabora: (not Mbama).
Maguzu: 110 km. N.E. Tabora: (not Magusu's, Magusa).
Malu: 190 km. N.W. Tabora: alt. Mbalu.
Manonga: riv., 150 km. N.E. Tabora: (not Manyonga, Manjonga).
Masanja: 160 km. N.E. Tabora: (not Masanya, Massanja's).
Masanja: 90 km. N.W. Tabora: (not Mazanya).
Masansa: 140 km. W. Tabora: (not Mzasa, Msassa's, Msasa's).
Maweta: 125 km. N. Tabora: (not Maveta).
Mdewerewa: pr. Mdewérewa: 150 km. N.W. Tabora: alt. Mdewerewa kwa Mtongolingo: (not Mdewerua, Mdeverwa, Mdewerwa).
Mgagala: pr. Mgágala: 125 km. W. Tabora: alt. Mgagala kwa Marui: (not Ngagara, Marui's, Marwi's).

Mikonka: riv., 185 km. N.W. Tabora: alt. Ikunga: (not Mikonga, Nikonga).
Mlela: 100 km. N.W. Tabora: (not Mlera, Mlära).
Mlimasunzo: 75 km. N. Tabora: (not Mlimassunso).
Msabila: 125 km. S.E. Tabora: (not Mzabila, Mazbi's).
Mtambirisho: pr. Mtámbirisho: 115 km. N. Tabora: (not Mtambirishia, Mtambirischia's).
Mtegazi: 200 km. N.E. Tabora: (not Mtegasi's, Kitalala's).
Mwasimba: 195 km. N.E. Tabora: (not Mwazimba, Muazimba, Muasimba).
Mwhala: riv., 100 km. E. Tabora: alt. Kwala: (not Mhvala, Mvala, Mwala, Mhwala, Wala).
Nyahua: 85 km. S.E. Tabora: (not Nyahwa, Njahua).
Nyomvio: pr. Nyómvio: riv., 140 km. S.E. Tabora: (not Njomwio).
Nyongola: 115 km. S. Tabora: alt. Isinde: (not Njongola's, Issinde).
Sagenda: riv., 100 km. N.E. Tabora: alt. Bimbi: (not Zagenda).
Sakalazya: pr. Sakálazya: 135 km. N.E. Tabora: (not Sagalazya, Sagalasja).
Salawe: 185 km. N. Tabora: alt. Salawe kwa Ngombe: (not Ssalaue, Salaue).
Samalu: 75 km. N.E. Tabora: (not Samalo's).
Saragata: 105 km. N.W. Tabora: (not Zaragata's).
Shama: riv., 150 km. S. Tabora: (not Schama).
Shikara: 100 km. N.E. Tabora: alt. Yawa: (not Schikara's, Shikare's, Jawa, Yaua).
Shinyanga: 165 km. N.E. Tabora: (not Schinjanga).
Sikonge: 65 km. S. Tabora: (not Zikonge).
Simba: 100 km. N.E. Tabora: alt. Tambarale: (not Zimba).
Solezi: 150 km. S.E. Tabora: alt. Ikulu kwa Solezi: (not Ikulu-kwa-Ssolesi, kwa-Solesi).
Ugunda: 180 km. S.W. Tabora: (not Ukavunda, Ukawunda's).
Umbulu: 200 km. N.E. Tabora: (not Wumbulu, Vumbulu).
Unyamwezi: locality, Tabora Dist.: (not Unjamwesi, Unyamvezi).
Unyanyembe: locality, Tabora Dist.: (not Unjanjembe).
Usanda: hill, 145 km. N.E. Tabora: (not Ussanda, Ussande).
Ushirombo: 200 km. N.W. Tabora: (not Uschirombo, Mariahilf).
Usoke: 50 km. W. Tabora: (not Ussoke).
Usongo: locality, Tabora Dist.: (not Ussongo).
Usumbwa: locality, Tabora Dist.: (not Ussumbwa).
Uyuwi: locality, Tabora Dist.: (not Uyui, Ujui, Uywi).
Whimo: 155 km. N. Tabora: (not Wimo, Vimo's, St. Michael).

KONDOA IRANGI DISTRICT.

Galapo: 70 km. N. Kondoa Irangi: (not Gwanzave, Gwanzawe, Gwansaue, Gwansawe, Ufiome).
Goima: pr. Gó-ima: 35 km. S.E. Kondoa Irangi: alt. Goima kwa Damas: (not Damass, Goïma-kwa-Damassi).

Kijungu: 165 km. S.E. Kondoa Irangi: (not Kidjungu, Kidschungu).
Mambaka: 75 km. S.W. Kondoa Irangi: (not Mtowero, kwa Tovero, kwa-Towero, kwa-Towera, kwa Mtowera).
Masagaloda: 75 km. N.W. Kondoa Irangi: (not Masogoloda, Massagaloda, Massogoloda, Marumbi's).
Murgusya: pr. Murgúsya: 80 km. S.E. Kondoa Irangi: (not Murgusia, kwa-Murgussia).
Sekenke: 210 km. N.W. Kondoa Irangi: (not Zekenke, Ssekenke).
Usandawi: locality, Kondoa Irangi Dist.: (not Ussandaui).
Usure: 180 km. W. Kondoa Irangi: (not Ussure).

DODOMA DISTRICT.

Bangajega: 35 km. N.W. Kilimatinde: (not Bangayega, Bangadjega, Bagajeda).
Chaya: lake, 105 km. W. Kilimatinde: (not Tschaja, Kyaya, Tshaya).
Dodoma: pr. Dódoma: town and dist.: properly Idodoma.
Ibwijili: pr. Ibwíjili: 35 km. E. Dodoma: (not Buigiri, Bugiri).
Igulwe: mt., 80 km. S.E. Dodoma: (not Gulwe, Guluë).
Ihumwa: 15 km. E. Dodoma: (not Humva, Ihumva).
Isawa: 120 km. S.W. Kilimatinde: (not Zaba, Saba).
Iseke: pr. loc. Iseche: locality, 85 km. S.W. Dodoma: (not Useke, Usseke).
Isusu: 130 km. S.W. Dodoma: alt. Isusu kwa Kagoa: (not Zusu, Sussu).
Itiso: 65 km. N.E. Dodoma: alt. Itiso kwa Meda: (not Tissu-kwa-Meda, Tisu, Tisso, Meda).
Iyumbu: riv., 75 km. N.W. Kilimatinde: (not Iwumbu, Iwumba, Ivamba, Ivumbu, Iwamba, Vumbu).
Kazikazi: 85 km. W. Kilimatinde: (not Kasikasi).
Kigwe: pr. loc. Chí-: 35 km. N.W. Dodoma: alt. Nganda.
Kinyasungwe: pr. loc. Chí-: riv., 50 km. E. Dodoma: (not Kinyazungwi, Kinjassungwe, Djinasungwi).
Kipanga: pr. loc. Chí-: 45 km. W. Dodoma: (not Kipanda, Ngogolo's).
Kipumbu: pr. loc. Chí-: 115 km. N. Kilimatinde: alt. Mgori: (not Magori).
Kisokwe: pr. loc. Chí-: 75 km. S.E. Dodoma: (not Kizokwe, Kissokwe).
Kitunda: pr. loc. Chí-: 225 km. S.W. Kilimatinde: alt. Itunda.
Kitunda: pr. loc. Chí-: 20 km. N. Dodoma: alt. Kitunda kwa Meda: (not Meda).
Kizigo: riv., 100 km. S. Dodoma: (not Kisigo).
Kongwa: 70 km. E. Dodoma: (not Kongoa).
Kulewelwa: 35 km. S.W. Kilimatinde: (not Kuleveroa's, Kuleweroa's).
Makasumbi: riv., 120 km. S.W. Dodoma: (not Makassumbi).
Mandama: riv., 80 km. S. Dodoma: alt. Dungomaro.
Manyonyi: 20 km. N.W. Kilimatinde: (not Manjoni).
Mbahi: 60 km. N.W. Dodoma: (not Ibahi, Bahi).
Mkwaya: 85 km. W. Dodoma: (not Mkwaiya, Mkweija's, Useke).
Mlazo: 95 km. S. Dodoma: (not Mlaso).

Mpwanila: 105 km. S.E. Dodoma: alt. Mpwanila kwa Zagoi: (not Mpanira-kwa-Sagoi).
Mpwapwa: 85 km. S.E. Dodoma: (not Mpapwa, Mpapua).
Msagali: 65 km. S.E. Dodoma: (not Mzagali).
Msawira: pr. Msáwira: 220 km. S.W. Kilimatinde: alt. Ikulu kwa Msawira, Kwikuru kwa Msawira: (not Mtzavira, Mtsawira, Kwi Kuru).
Muhezi: riv., 65 km. S.W. Kilimatinde: (not Muhesi, Muhessi).
Musa: 180 km. S.W. Kilimatinde: (not Mussa).
Mvumi: 30 km. S.E. Dodoma: (not Mwumi, Wumi, Vumi).
Myombe: riv., 110 km. S. Dodoma: alt. Mzombe: (not Mjombe, Msombe).
Nguruwala: 135 km. S.W. Kilimatinde: alt. Ikulu kwa Nguruwala, Kiromo, Kwikuru kwa Kiromo: (not Nguruvala, Kwi Kuru).
Njogi: 120 km. E. Dodoma: (not Nyogi, Ndjogi, Ndschogi).
Nyangalo: 45 km. E. Dodoma: (not kwa-Nyangallo, Njangalo).
Nzinje: 15 km. N.W. Dodoma: (not Nzinge, Zinge, Singe).
Saranda: 15 km. N. Kilimatinde: (not Zaranda).
Singida: 120 km. N. Kilimatinde: (not Ssingida, Singidda).[1]
Suna: 55 km. N.W. Kilimatinde: alt. Tandu: (not Ssuna).
Uyanzi: locality, Dodoma Dist.: (not Uyansi, Ujansi).
Wamba: 85 km. W. Kilimatinde: alt. Ikulu ya Wamba, Ikuru kwa Wamba, Kasuwi: (not ja Wamba, Kassuwi).

USAMBARA DISTRICT

(formerly Wilhelmstal District).

Bwiko: 30 km. N.W. Lushoto: (not Buiko).
Gare: 5 km. E. Lushoto: alt. Gale: (not Neu-Köln).
Gonja: 65 km. N.W. Lushoto: (not Gonya).
Kihurio: 45 km. N.W. Lushoto: alt. Kihulio: (not Kihuiro, Kihwiro).
Kisiwani: 80 km. N.W. Lushoto: (not Kizwani, Kisuani, Kiswani).
Kitivo: 30 km. N.E. Lushoto: (not Kitiwo).
Korogwe: pr. Ko-ro-gwe: 45 km. S.E. Lushoto: conv. for Nkologwe.
Kwai: 10 km. N.E. Lushoto: (not Kwei).
Lushoto: town: (not Wilhelmstal).
Makanya: 70 km. N.W. Lushoto: (not Makanja, Makandja).
Makuyuni: 25 km. S. Lushoto: (not Makujuni, Makunjuni, Makunyuni).
Mambo: 55 km. N.W. Lushoto: (not Friedenstal).
Mazinde: 10 km. W. Lushoto: (not Masinde).
Mkalamo: 30 km. S.W. Lushoto: (not Mkaramo).
Mkomazi: 30 km. N.W. Lushoto: (not Mkomasi).
Mlalo: 25 km. N.E. Lushoto: (not Hohenfriedeberg).
Mtai: pr. Mtá-i: 35 km. N. Lushoto: (not Neu-Bethel, New Bethel).
Shume: 15 km. N.W. Lushoto: (not Neu-, New Hornow).
Usambara: dist.: conv. for Ushambala.

Vudei: pr. Vudé-i: 85 km. N.W. Lushoto: alt. Vudei kwa Makore: (not Vudai, Wudei, Wudee, Vude).
Vugha: 15 km. S.E. Lushoto: (not Vuga, Wuga).
Vugiri: 35 km. S.E. Lushoto: (not Wugiri).

TANGA DISTRICT.

Bwembwela: 45 km. W. Tanga: (not Bombuera, Bombwera).
Bwiti: 45 km. N.W. Tanga: (not Buiti).
Jasin: 45 km. N. Tanga: alt. Jasini, Yasin: (not Jassin, Wasin).
Kihuhwi: 50 km. W. Tanga: (not Kihuhui).
Manza: 25 km. N. Tanga: (not Mansa).
Misozwe: 35 km. W. Tanga: (not Misoswe, Missosswe).
Mkuzi: 35 km. S.W. Tanga: (not Mkusi, Mkussi).
Mnyuzi: 60 km. W. Tanga: (not Nyusi, Njussi).
Moa: 35 km. N. Tanga: alt. Mwoa.
Msimbazi: riv., 10 km. N. Tanga: (not Msimbasi, Msembasi).
Mtangata: 20 km. S. Tanga: (not Tangata).
Muheza: 35 km. W. Tanga: (not Muhesa).
Zigi: 50 km. W. Tanga: (not Sigi, Ssigi).

PANGANI DISTRICT.

Kiseru: riv., 170 km. W. Pangani: (not Kisseru).
Magamba: 100 km. W. Pangani: (not Sonyo, Ssonyo's, Ssonjo's).
Mahazi: 150 km. S.W. Pangani: alt. Mahazi kwa Ngage: (not Mahasi).
Mjonga: riv., 150 km. W. Pangani: (not Mdjonga, Mdschonga).
Mkuzi Katani: 10 km. N. Pangani: (not Mkutsikatani).
Mkwaja: 45 km. S.E. Pangani: (not Mkwadya, Mkwadja).
Mlele: 90 km. W. Pangani: alt. Mrere: (not Mlere, Kwamlere).
Mligazi: riv., 65 km. S.W. Pangani: alt. Mrigazi: (not Mligasi).
Msangazi: riv., 25 km. S.W. Pangani: (not Msangasi, Mssangassi).
Msiha: riv., 135 km. S.W. Pangani: (not Mziha, Mssiha).
Mundo: 5 km. N. Pangani: (not Bushirihof, Buschirihof).
Ruvu (Pangani): riv., Pangani Dist.: (not Ruwu, Rufu).
Sindeni: 85 km. W. Pangani: (not Zindeni).

BAGAMOYO DISTRICT.

Bagamoyo: town and dist.: (not Bagamojo).
Changohera: 25 km. S.E. Bagamoyo: (not Changohara, Tschangohära, Tshangohaera).
Kisuka: 85 km. S.W. Bagamoyo: (not Kissuka).
Lusako: 30 km. W. Bagamoyo: alt. Rosako: (not Lussako, Rossako).
Mbwawa: 25 km. S.W. Bagamoyo: (not Bwawa, Bwaua).
Mkombezi: riv., 25 km. S.W. Bagamoyo: (not Mkombesi, Kombesi, Gombesi).

Msente: 120 km. N.W. Bagamoyo: (not Mssente).
Porokanya: riv., 40 km. N.W. Bagamoyo: (not Porokanja, Purahanya).
Ruvu (Kingani): riv., Bagamoyo Dist.: (not Ruwu).
Sa'dani: 45 km. N. Bagamoyo; Ar. سعدانى: (not Saadani, Zadani, Ssaadani).
Uzigula: locality, Bagamoyo Dist.: alt. Usiguha: (not Uzigua, Usigua, Uzeguha, Uzegula).
Windi: 20 km. N. Bagamoyo: (not Winde).

MOROGORO DISTRICT.

Dakawa: 45 km. N. Morogoro: (not Dakava, Derkawa).
Gairo: pr. Ga-iro: 110 km. N.W. Morogoro: (not Geiro).
Kilosa: pr. Kilŏ-sa: 80 km. W. Morogoro: (not Kilossa).
Kisaki: 75 km. S. Morogoro: (not Kissaki).
Kisemo: 60 km. E. Morogoro: (not Kissemo).
Kiviza: 40 km. N.E. Morogoro: alt. Ngole: (not kwa Kivizi, kwa Kivisi, kwa-Kiwisa).
Kutu: locality Morogoro Dist.: alt. K'hutu: (not Khutu).
Mamboya: 85 km. N.W. Morogoro: (not Mamboja).
Mbwiga: 85 km. S.W. Morogoro: alt. Mbwiga kwa Mgalawe: (not Mbuiga-kwa-Magalaue).
Mikese: 25 km. E. Morogoro: (not Mikesse).
Mkata: 40 km. W. Morogoro: (not Mkatta).
Morogoro: town and dist.: prop. Murogoro: (not Mrogoro).
Msagara: 90 km. W. Morogoro: alt. Mwinyisagara: (not Mzagara, kwa-Mwini-Ssagara).
Myombo: 75 km. W. Morogoro: (not Mjombo).
Tununguo: pr. Tununguó: 35 km. S.E. Morogoro: (not Tunungwo).
Usagara: locality, Morogoro Dist.: (not Ussagara).

DAR ES SALAAM DISTRICT.

Dar es Salaam: town and dist.: conv. for Ar. دار السلام = Dār es Salām: (not Daressalam).
Kifumangao: 75 km. S. Dar es Salaam: (not Kivmangao, Kiwmangao).
Kimbiji: 35 km. S.E. Dar es Salaam: (not Kimbidji, Kimbidyi).
Kisangire: 90 km. S.W. Dar es Salaam: (not Kissangire).
Kisegese: 90 km. S.W. Dar es Salaam: (not Kissegesse).
Kiserawe: 25 km. W. Dar es Salaam: (not Kisserawe).
Kisiju: 65 km. S. Dar es Salaam: (not Kissiju, Kissidju, Kissidyu).
Konduchi: 20 km. N.W. Dar es Salaam: (not Kondutschi, Kondutshi).
Mafisi: 75 km. W. Dar es Salaam: (not Mafizi).
Malusembe: 50 km. S.W. Dar es Salaam: (not Malussembe).
Mbweni: 35 km. N.W. Dar es Salaam: (not Bueni).
Mpiji: 35 km. W. Dar es Salaam: (not Mpiyi).
Mzinga: riv., Dar es Salaam Dist.: (not Msinga).

Shungu Bweni: 40 km. S.E. Dar es Salaam: (not Shungu-Bueni, Schungu-Bweni).
Uchembe: 85 km. S.W. Dar es Salaam: (not Utschembe, Utshembe).
Uzaramo: locality, Dar es Salaam Dist.: (not Usaramo).

RUFIJI DISTRICT.

Chole: isld. Rufiji Dist.: (not Tschole, Tshole).
Juani: isld. Rufiji Dist.: (not Djuani, Dschuani).
Kiasi: 75 km. E. Utete: (not Kiassi, Kyasi).
Kibambawe: 80 km. N.W. Utete: alt. Kibambawe kwa Kungulio: (not Kungulio).
Kichi: locality, Rufiji Dist.: (not Kisi, Kissi, Kitschi, Kitshi).
Lugonya: riv., 20 km. S.W. Utete: (not Lungonya, Lungonja).
Mafia: pr. Mafía: isld., Rufiji Dist.: alt. Chole Shamba: (not Tschole-Schamba, Tshole-Shamba).
Mkalinzo: 95 km. W. Utete: (not kwa Mkalinzo, kwa-Mkalinso).
Msindaji: 70 km. N.E. Utete: (not Mssindadji, Mssindadyi).
Mtanza: 40 km. N.W. Utete: (not Mtansa).
Nyamseti: 35 km. S.E. Utete: (not Nanshete, Nanshette).
Nyaringwe: 10 km. N.E. Utete: (not Nyalingwa, Njalingwa).
Rufiji: riv. and dist.: (not Rufiyi).
Salale: 65 km. N.E. Utete: (not Zalale, Ssalale).
Samanga: 70 km. S.E. Utete: (not Ssamanga).
Simba Uranga: 70 km. N.E. Utete: (not Ssimba-Uranga).
Utunge: 40 km. W. Utete: (not Utungi, Utenge).

UFIPA DISTRICT

(formerly Bismarckburg District).

Galula: 240 km. N.E. Kasanga: alt. Salaupina: (not Ssalaupina).
Izembe: 200 km. N.E. Kasanga: (not Isembe).
Izimbiri: 250 km. N. Kasanga: (not Isimbiri).
Kabuyenze: 290 km. N.W. Kasanga: (not Kabujänse's).
Kafishia: pr. Kafíshia: 210 km. N.W. Kasanga: alt. Kafishia kwa Mkayala: (not Kafischia-kwa-Mkajala, Mkajala's).
Kafunya: riv., 135 km. N.W. Kasanga: (not Kafunja).
Kasanga: town: (not Bismarckburg).
Kibwesa: 265 km. N.W. Kasanga: (not Kibwezi, Kibwesi).
Kirasa: 140 km. N.E. Kasanga: (not Kiraza's).
Kungue: pr. Kungú-e: mt., cape, and bay, 300 km. N.W. Kasanga: (not Kungwe).
Luegere: riv., 300 km. N.W. Kasanga: (not Lwegere).
Maguza: 275 km. N.E. Kasanga: (not Magusa, Magussa).
Mbueni: 275 km. N.E. Kasanga: (not Mbweni's, Bueni).
Mdabulo: 275 km. N.E. Kasanga: alt. Mtitimia: (not Mudabulo, Mdidimia).
Mivozia: pr. Mivózia: 375 km. N.W. Kasanga: (not Miwosia, Maschua's, Masswa's).

Mkasa: 275 km. N.W. Kasanga: (not Mkassa's).
Momba: riv., 130 km. E. Kasanga: alt. Saisi: (not Ssaissi).
Mpimbwe: 140 km. N. Kasanga: (not Mpimbue).
Mpimbwe: cape, 165 km. N.W. Kasanga: (not Mpimbue).
Msadia: riv., 150 km. N. Kasanga: (not Mzadia).
Msaginya: riv., 200 km. N. Kasanga: (not Mzagina, Msagina).
Msamba: 85 km. N.W. Kasanga: (not Mzamba's).
Msia: 105 km. N.E. Kasanga: alt. Nzyuka: (not Msjia, Mssjia, Mzyia, Nsyuka's).
Msima: riv., 250 km. N. Kasanga: (not Mssima).
Mulitete: 310 km. N.W. Kasanga: alt. Mulitete kwa Kavirola, Kakungu: (not Kavirola, Kawirola's).
Mwipa: riv., 225 km. N.E. Kasanga: (not Muipa).
Mwise: riv., 235 km. N.E. Kasanga: (not Muisse).
Mzengusi: riv., 210 km. N.W. Kasanga: (not Msengussi).
Ngalu: 145 km. N.E. Kasanga: (not Ngeru, Ngäru's).
Nyamanzi: riv., 300 km. N. Kasanga: (not Nyamansi, Niamanzi).
Nyanya: 245 km. E. Kasanga: (not Njanja).
Nzyuba: 250 km. N.W. Kasanga: (not Nsyuba, Nsjuba's).
Pamzanga: 170 km. N.E. Kasanga: (not Pamsanga).
Safu: riv., 30 km. S.E. Kasanga: alt. Samfu, Luntua: (not Ssafu, Sumfu).
Sakalilo: 100 km. N.E. Kasanga: (not Zakalilo, Ssakalilo).
Sepa: 155 km. N. Kasanga: (not Ssepa).
Sera: 195 km. N.W. Kasanga: (not Ssera).
Simba: 105 km. N.E. Kasanga: (not Zimba).
Sumbawanga: 80 km. N.E. Kasanga: alt. Kapufi: (not Zumbawanga, Zumbavanga).
Sumbwanga: 130 km. E. Kasanga: (not Zumbwanga).
Ulindwa: 310 km. N.W. Kasanga: alt. Tetezi: (not kwa-Tetesi, kwa-Tetäsi).
Uluila: 230 km. N. Kasanga: (not Ukayala, Ukajala).
Uwende: locality, Kasanga Dist.: (not Ukawende, Ukavende).
Vombwe: 185 km. N.E. Kasanga: (not Wombwe's).
Vuku: riv., 150 km. N.E. Kasanga: (not Wuku).

RUNGWE DISTRICT

(formerly Langenburg District).

Galula: 100 km N.W. Tukuyu: alt. Igalula: (not St. Moritz).
Ileje: 55 km. S.W. Tukuyu: (not Iledje, Ilädje).
Isoko: 30 km. S.W. Tukuyu: (not Izoko).
Itaka: 100 km. N.W. Tukuyu: (not Ithaka).
Itete: 25 km. S.E. Tukuyu: (not Neu-, New Wangemannshöhe).
Iwungu: 125 km. N.W. Tukuyu: (not Ivungu).
Iyunga: 80 km. N.W. Tukuyu: (not Yunga, Junga).
Kiwira: riv., 25 km. S. Tukuyu: (not Kivira, Kivara).

Kyimbila : 5 km. S.E. Tukuyu : (not Kiyimbila, Kijimbila, Kjimbila).
Lumbira : 70 km. S.E. Tukuyu : (not Rumbira, Alt-, Old Langenburg).
Magoje : 50 km. N.E. Tukuyu : (not Magoye).
Masoko : 15 km. S.E. Tukuyu : (not Massoko, Masoka).
Mbozi : 85 km. N.W. Tukuyu : (not Mbosi).
Mkulwe : 165 km. N.W. Tukuyu : (not Mkurue, Itava, Itawa, St. Bonifaz, St. Boniface).
Mwakaleli : 25 km. N.E. Tukuyu : (not Muakaleli, Mwakareri)
Mwasukulu : 20 km. S.E. Tukuyu : (not Masukulu, Nsuguru, Mschamba, Msamba's).
Mwaya : 50 km. S.E. Tukuyu : (not Mvaya, Mwaja, Muaja).
Ruiwa : 55 km. N. Tukuyu : (not Ruiva, Rwiva).
Songwe : riv., 100 km. N.W. Tukuyu : (not Ssongwe).
Songwe : 60 km. S.E. Tukuyu : (not Ssongwe).
Tukuyu : town : (not Ntukuju, Ntukuyu, Neu-Langenburg, New Langenburg).
Ulongwe : 45 km. E. Tukuyu : (not Bulongwa).
Unyiha : locality, Tukuyu Dist. : (not Unyika, Unjika, Unika).
Wungu : locality, Tukuyu Dist. : (not Vungu).

IRINGA DISTRICT.

Igalawa : 160 km. S.W. Iringa : (not Galawa, Galiwa).
Igawiro : 145 km. S.W. Iringa : (not Gaviro, Gawiro).
Igominyi : 65 km. S.W. Iringa : (not Gominyi, Ngominyi, Ngominji, Ngominye).
Isambwa : 215 km. W. Iringa : (not Izambwa's).
Isuka : 30 km. S. Iringa : (not Suka, Ssuka).
Kalenga : 10 km. W. Iringa : (not Old Iringa, Alt-Iringa).
Kipembawe : 245 km. W. Iringa : alt. Nkulu : (not Kipembabwe).
Kiwere : 155 km. S.W. Iringa : (not Kivere).
Lukose : riv., 70 km. N.E. Iringa : (not Lukosse).
Masimba : 230 km. W. Iringa : (not Mazimba, Massimba).
Mkoji : riv., 175 km. S.W. Iringa : (not Mkodji, Mkodje).
Mlewa : 150 km. W. Iringa : (not Mleva's, kwa Mlewa).
Mlewera : 55 km. N. Iringa : (not Mlevera).
Mpwasa : 125 km. N.W. Iringa : (not Mpuassa, kwa-Mpwassa).
Mzombe : 185 km. S.W. Iringa : alt. Ngozingozi : (not Ngosingosi's, Ubena).
Ruaha : riv., Iringa Dist. : (not Rwaha).
Serebu : mt., 70 km. N.E. Iringa : (not Zerebu).
Soliwaya : 160 km. S.W. Iringa : (not Solowayo, Solowajo, Zolovayo).
Tosamaganga : 15 km. S.W. Iringa : (not Tossamaganga).
Udzungwa : range, Iringa Dist. : (not Uchungwe, Utschungwe, Utshungwe, Utzungwa).
Uhanyana : 155 km. S.W. Iringa : (not Neu-Mufindi, Emmaberg).
Usangu : locality, Iringa Dist. : (not Ussangu).

MAHENGE DISTRICT.

Furua: pr. Furúa: riv., 60 km. s.w. Mahenge: (not Furwa, Fulua).
Kihanzi: riv., 60 km. N.W. Mahenge: (not Kihansi).
Luwegu: riv., Mahenge Dist.: (not Luvegu).
Manani: 60 km. N.E. Mahenge: alt. Ngahoma.
Mnyera: riv., 110 km. W. Mahenge: (not Mnjera).
Msima: 105 km. S.W. Mahenge: (not Mtzima, Mtsima).
Mtende: 70 km. E. Mahenge: alt. Mtende kwa Mpinda: (not Ntende, Mpinda).
Nyama: riv., 150 km. S.W. Mahenge: (not Njama).
Ruhuje: riv., Mahenge Dist.: (not Ruhudje).

SONGEA DISTRICT.

Bagaya: 85 N.E. Songea: not Bagaja's).
Chetevaka: 125 km. N.W. Songea: (not Chetewaka, Tschetewaka).
Chivongo: 100 km. S.W. Songea: (not Tschiwongo).
Gwasai: 75 km. N.E. Songea: (not Gwassei, Guassai).
Kawunguya: 130 km. N. Songea: (not Kawanguya, Kawunguja).
Kigonzera: 65 km. W. Songea: (not Kigonsera).
Lihowera: mt., 105 km. E. Songea: (not Lihovera, Lihowära).
Limesi: 70 km. N.W. Songea: (not Limessi).
Lukimwa: riv., 70 km. S.E. Songea: (not Lukimva).
Lumecha: riv., 25 km. N. Songea: (not Lumesi, Lumessi).
Manda: 120 km. W. Songea: (not Ilela, Wiedhafen, Wiedhaven).
Mangua: pr. Mangúa: 20 km. W. Songea: (not Mangwa).
Mbegera: 150 km. N.W. Songea: (not Kihawa, Kihava, Mbejera's).
Mlongozi: riv., 40 km. S. Songea: (not Mlongosi).
Mzamara: 5 km. N.W. Songea: (not Msamara).
Mzangezi: riv., 125 km. S.E. Songea: (not Msangasi, Msangesi, Msengesi).
Njuga: riv., 25 km. E. Songea: (not Nyuga).
Nyamtumbo: 50 km. N.E. Songea: (not Njamtumbo's).
Pangire: 160 km. N.W. Songea: (not Jacobi, Yakabi).
Sanangula: 20 km. N.E. Songea: (not Zamanguli, Zanangula's, Samangulia).
Songea: pr. Songéa: town and dist.: (not Ssongea).
Usangila: pr. Usángila: 75 km. N.W. Songea: (not Usangire, Ussangire).

KILWA DISTRICT.

Ananganje: 100 km. S.W. Kilwa: (not Ananganye's).
Kihenje: 55 km. S.W. Kilwa: (not Kihendye, Kihendje).
Kilwa: town and dist.: alt. Kilwa Kivinje: (not Kilwa-Kiwindje, Kilwa-Kiwindsche).
Kilwa Kisiwani: 25 km. S.E. Kilwa: (not Kilwa-Kissiwani, Kilwa Kissivani).

Kiwatama: 35 km. s. Kilwa: (not Kivatama).
Liwale: 200 km. s.w. Kilwa: (not Livale).
Madaba: 180 km. w. Kilwa: alt. Madaba kwa Kapolo: (not kwa-Kapolo).
Mavuji: riv., 30 km. s. Kilwa: (not Mavudyi, Mawudji, Mawudschi).
Mbarikiwa: 185 km. s.w. Kilwa: (not Barikiwa, Barikiva).
Mchemera: 65 km. w. Kilwa: (not Chemera, Tshemera).
Mkondaji: 45 km. s. Kilwa: (not Mkondaje, Mkondadye, Mkondadje, Mkondadsche).
Mnembwe: riv., 190 km. s.w. Kilwa: (not Nembue, Nembwe).
Mtumbei: pr. Mtumbé-i: riv., 55 km. w. Kilwa: (not Mtumbai).
Muhinje: 150 km. w. Kilwa: (not Muhinye).
Nambanje: 90 km. w. Kilwa: (not Nambaniye, Nambanye).
Nanguwe: 120 km. w. Kilwa: (not Nyanguve, Nyanguwe, Nonguwe).
Njenje: riv., 230 km. s.w. Kilwa: (not Nyenye).
Njinjo: 60 km. w. Kilwa: (not Nyinyo, Jingo).
Ruhuhu: 220 km. s.w. Kilwa: (not Ruhuvu, Ruhuwu).
Ruhuhu: riv., 220 km. s.w. Kilwa: alt. Luhuhu: (not Ruhuwu, Ruhuvu).
Shuguli: falls, 220 km. w. Kilwa: (not Schuguli).
Songo Mnara: isld., 40 km. s.E. Kilwa: (not Songa, Ssonga-Manara).
Songo Songo: isld., 25 km. N.E. Kilwa: (not Songa Songa, Ssongo-Ssongo).
Zinga: riv., 65 km. s.w. Kilwa: (not Singa).

LINDI DISTRICT.

Chitama: riv., 85 km. s. Lindi: (not Kitama).
Chiwata: 100 km. s.w. Lindi: (not Chivata, Tschiwata, Tshiwada).
Kongowele: mt., 190 km. s.w. Lindi: (not Kongovere, Kongowere, Kongowero).
Lumesule: riv., 200 km s.w. Lindi: (not Limasule, Limassule).
Luwingu: riv., 310 km. s.w. Lindi: (not Luwingo, Luvingo).
Machemba: 195 km. s.w. Lindi: (not Matschemba's, Matshemba).
Mahiwa: 65 km. s.w. Lindi: (not Mahiva).
Majeja: locality, s. Lindi Dist.: (not Majeje, Madjedje, Madschedsche).
Makomo: 300 km. s.w. Lindi: alt. Luwira, Kirimira: (not Luvira).
Masasi: 125 km. s.w. Lindi: (not Massassi).
Mbuo: pr. Mbúo: riv., 45 km. s.E. Lindi: (not Mbwo).
Mchinga: 30 km. N. Lindi: (not Mtschinga, Mtshinga).
Mchinjili: 60 km. w. Lindi: (not Mchinyiri, Mtschinjiri, Mtshinyiri).
Miesi: riv., 130 km. s.w. Lindi: alt. Miedi: (not Miessi, Miesse).
Mnasi: 80 km. s.E. Lindi: (not Mnazi).
Msinijewe: riv., 250 km. s.w. Lindi: (not Msinyave, Msiniava, Mzinieva, Msiniäwe, Msindschewe).
Mtetesi: 240 km. s.w. Lindi: (not Mtetessi).

Muhuwesi: riv., 240 km. s.w. Lindi: alt. Muwesi: (not Mohesi, Mohezi, Muhuvesi).
Mwera: plateau, 30 km. w. Lindi: (not Muera).
Mwiti: 110 km. s.w. Lindi: (not Mviti).
Naitiwi: 20 km. w. Lindi: (not Naitivi, Neitivi, Neitiwi).
Newala: 125 km. s.w. Lindi: (not Nevala).
Nyangao: 60 km. s.w. Lindi: (not Njangao).
Ruawa: 30 km. N. Lindi: (not Ruava).
Ruvuma: riv., Lindi Dist.: alt. Luvuma: (not Rovuma, Rowuma).
Sasawara: 350 km. s.w. Lindi: (not Sasavara, Ssassawara).
Sudi: 30 km. S.E. Lindi: (not Zudi, Ssudi).
Tunduru: 285 km. s.w. Lindi: alt. Tunduru ya Mwisho: (not Tunduru-ja-Mwischo, Tunduru ya Mvisho).

LIST OF PUBLICATIONS

for the Permanent Committee on Geographical Names by the Royal Geographical Society, Kensington Gore, London, S.W. 7.

PRICE SIXPENCE EACH.

FIRST GENERAL LIST OF EUROPEAN NAMES.
FIRST GENERAL LIST OF ASIATIC NAMES.
FIRST GENERAL LIST OF AFRICAN NAMES.

LONDON: PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
DUKE STREET, STAMFORD STREET, S.E. 1, AND GREAT WINDMILL STREET, W. 1.

INDEX

* Denotes Articles and Papers. § Reviews and Notices.

A.

ABDI stream, Aures massif, 20
Abeshr, Wadai, 237–239
Ab-i-Chimishk, river, Luristan, 442
Abyod, Wad el, Aures Mtns., 21
Adhfa, Arabia, 412
Adre, Wadai, 235
Africa, East— E. A—n Force, 1915–1919: Brig.-Gen. C. P. Fendall, 302 §; Rift Valleys and Geology of: J. W. Gregory, 141 §; Twenty-Five Years in: J. Roscoe, 140 §
——, North— Studies in: C. F. Grant, 209 §; Three Travellers in: Hon. E. Ward, 210 §
——, South— Pioneering and developt.: H. W. Struben, 467 §; Rainfall of, J. R. Sutton on, 472 §; S. A—n Geography: E. H. L. Schwarz, 140 §
——, Equatorial, Notes on Seasons in: F. W. H. Migeod, 52 *
African Rift Valleys, R. D. Oldham on, 151; ditto: Errata, 222
Africanus, L., on Berber habitations, 24
Aftan, Wadi, Arabia, 334
Aïr, Expln. of, etc.: A. Buchanan, 467 §
Ajibba, Arabia, 328
Akaba depression, 417, 418
Aku Qualandari, *saiyids*, Luristan, 441
Alberta, Equat. Africa, seasons at, 53
Aleppo, position, 457
Algeria, Among Hill-folk of: M. W. Hilton-Simpson, 303 §: *see* Aures Mts.
Ali Dinar, Sultan of Darfur, 233
Ali Ilahis sect, Pish-i-Kuh, 341
Alphabets of Foreign Languages, etc.: Maj.-Gen. Lord E. Gleichen and J. H. Reynolds, 310 §
Alpine Valleys, Sunny and Shady Sides of, M. Vessereau on, 310 §
Altitudes, high, health at, 107–108
Amdo-tsonak, lake, Tibet, 261
America, Norse Discoveries of, etc.: G. M. Gathorne-Hardy, 65 §
——, North, Fur Trade of America: A. Laut, 64 §
Anaiza, Arabia, 407
Anaraki stream, Luristan, 350
Andes, Glacier Expln. in Southern, F. Reichert's, 396 §
Andrews, R. C., Across Mongolian Plains, 301 §
Angami Nagas, etc.: J. H. Hutton, 209 §
Angot, A., on Rainfall of France, 69 §
Anouta, Mt. and lakes, China, 262–263
Anrick, C. J., on Distribn. of Arable Land, etc., in Sweden, 393 §
Antarctic— Great White South: H. G. Ponting, 143 §; South with Scott: Capt. E. G. R. Evans, 211 §
A-nu-yüeh, identity with Yasin, Hindukush, 127
Arab conquest of Central Asia, 115
——, Wed el, Aures Mtns., 22
Arabia, Ancient gold-mine in, Prof. Casanova on, 145 §; Capt. Shakespear's Last Journey: D. Carruthers, 321 *, 401 *; Routes in Middle, D. Carruthers on, 319
—— and War, 321 *et seq.*
Araij el Asiya sand-belt, Arabia, 328
—— el Bildani: *see* Nafud Shakri
Archæology and Ordnance Survey: O. G. S. Crawford, 245 *; ditto, J. W. Evans on, 479
Archer, A. B., British Isles, 208 §
Arctic, Friendly: V. Stefansson, 469 §
—— N. America, Danish Expedns., 72
Arfaja wells, Wadi Sirhan, Arabia, 415
Argeyl, Arabian brotherhood, 409, 417
Aridh hills, Arabia, 333
Arithmetical systems in Nicobars, 48–49
Arun— Valley, Himalayas, 91, 94; river system, 420–421
Asfalun, peak, Luristan, 354
Asia, Centr., Geogr. Coordinates in, 219 §; Serindia: A. Stein, 385 §
Athena, Herodotus on worship of, 33
Ati, Wadai, 240
Attar, Sudair village, Arabia, 332
Audah, Sudair village, Arabia, 332
Augiéras, Capt., expedn. in W. Sahara, 220 §
Aures Mts.— Influe. of Geogr. on People of A— Massif, Algeria: M. W. Hilton-Simpson, 19 *, 79 (*title only*); Journeys among Shawia of: *Id.*, 303 §
Aurora Borealis in Labrador, 158
Australia, S.E., Possibility of increasing Rainfall, E. T. Quayle on, 474 §
Auto-cartograph: Lt.-Col. M. N. MacLeod, 284 *
Avakubi, Equat. Africa, seasons at, 54
Avening Barrow, rediscovery, 250

B.

BACOT, M., discoverer of source of Irrawady, 262
Baddeley, J. F., Victoria medallist, 309
Baffin Isd. Eskimo, Econom. Life: H. T. Munn, 269 *
Bafwaboli, Equat. Africa, seasons at, 53
Baian Kara range, on early map of China, 260
Bairanvand tribe, Luristan, 347

Bala-Gariveh: C. J. Edmonds, 152 (*title only*), 335 *, 437 *
Bala Rud, river, Luristan, 350
Balfour, H., remarks on "People of Aures Massif, Algeria," 35
———, Hon. J. M., Recent Happenings in Persia, 466 §
Ballivian, M. V., obituary, 78
Baltistan, subjection to Tibetans, 8th century, 115
Bam-tso lake, Tibet, 86
Banban, Arabia, 334
Bantuland, In Heart of: D. Campbell, 388 §
Barbosa, Duarte, Book of: ed. M. L. Dames, 299 §
Bar Chu, river, Tibet, 9
Barns, T. A., Mokoto Lakes, W. Rift Valley, 356 *
Baseita plateau, Arabia, 415
Batang river, E. Tibet, 16
Batin: *see* Wadi er Rumma, 325
Battlefields of Gt. War: D. W. Johnson, 139 §
Bear in Baffin Id., 270 *et seq.*
Beerenberg Mt., Jan Mayen, 180, 187–189, 192
Belgium, Forms of Settlmt. in, M. Lefèvre on, 70 §
Bélime, M., on cotton growing in Upper Niger region, 223 §
Bell, Major, journey in Luristan, 339
——, Miss G., Arabian journeys, 324, 415
Bellovaci, Topography of Cæsar's last campaign against: H. O. Forbes, 195 *
Berna's visit to Jan Mayen, 185
Berthelon —, on Shawiyan designs, 31
———— and Chantre on N. African water-clocks, 29
Bertram's 'Intinerary of Richard of Cirencester,' 248
Betel Nut river: *see* Ping Lang
Bews, J. W., on Vegetation Belts in N.E. Zululand, 311 §
Bhong Chu, Arun river system, 420, 427
Bird Id., Jan Mayen, 190
Bishop, Mrs., journey in Luristan, 339, 342
Bita, Mokoto Lakes, 359
Blunts' route, Arabia, 410
Bol, Kanem, 243
Bompoka Id., Nicobars, 41, 42
Bon sect, E. Tibet, 5
Bowman, I., New World: Problems in Polit. Geog., 215 §
Boyce, A. A. R., Gill Memorial to, 309
Brahmaputra, source of, 266
Bristowe, W. S., entomological work in Jan Mayen, 187, 193
British Empire, Geology of: F. R. C. Reed, 68 §
——— Honduras: W. R. Dunlop on developt. of, 473 §
——— Isles: A. B. Archer, 208 §; for study of historical geography, 58–59
——— Phenology and Climate, E. J. Salisbury on, 309 §
Brocklehurst, Sir P., Across Wadai, 152 (*title only*), 233 *
Bromehead, C. E. N., Influence of Geogr. on developt. of London, 320 (*title only*)
Broodbank, Sir J. G., History of Port of London, 462 §
Brooks, C. E. P., on History of Climate in Europe, 218 §
Brunhes, J., Géographie Humaine de la France, 296 §
Bryce, Viscount, obituary, 315
———, R., Klagenfurt Plebiscite, 480 (*title only*)
Buchanan, A., Expln. of Aïr: etc., 467 §
Buddhism in Muhammadan Cent. Asia, 129
Budge, Sir E. A. W., on Egyptian religion, 31, 32
Buduma tribe, Lake Chad, 243
Bue, Equat. Africa, seasons at, 53
Buraida, Arabia, 408
Burton's journey in Luristan, 339
Bu Zina valley, Aures Massif, 20

C.

Cabot, W. B., Labrador, 468 §
Cæsar's last Campaign against Bellovaci, Topography of: H. O. Forbes, 195 *
Californian Trails, etc.: T. Hall, 142 §
Camden's names of Roman roads, 248
Campbell, D., In Heart of Bantuland, 388 §
Camsell, C., Murchison Grant to, 309
Candiotti, crossing of Novaya Zemlya, 375
Cape Brodrick, Jan Mayen, 190
Caracas, Longitude of, 222
Carles, W. R., Emperor Kang Hsi's edict on Mountains and Rivers of China, 258 *
Car Nicobar Id., 40, 41, 42, 45, 49
Caribou in Baffin Id., 269 *et seq.*; in Labrador, 156
Carolus, J., and discov. of Jan Mayen, 182
Carruthers, D., Capt. Shakespear's Last Journey, 321 *, 401 *; Routes in Middle Arabia, 319
Casanova, —, on Ancient Gold-mine in Arabia, 145 §
Chad, Lake, 242–243
Chamberlin, J. F., Geography, Physical, Economic, Regional, 143 §
Chamdo, Tibet, climate, 2
Chantre (*see* Berthelon), 29
Chapple, Major W. A., Fiji: its Problems and Resources, 66 §
Capursan valley, Hindukush, 129
Chaquarvand family, Khurramabad, 444
Chavannes, M., "Documents sur les Turcs occidentaux" quoted, 113 *et seq.*
Chaworth-Musters, J. L., botanical work in Jan Mayen, 187, 193; remarks on "Jan Mayen Id.," 194
Chemistry of Earth's Crust: H. S. Washington, 74 §
Chesney's Euphrates survey, 455, 457
Chigini tribe, Luristan, 448
Chile, Colonizn. in: M. Jefferson on, 396 §
China, Emperor Kang Hsi's edict on Mtns. and Rivers of: W. R. Carles, 258 *
Chinese Empire—Rainbow Bridge: R. Farrer, 62 §

Chinese Expdn. across Pamirs and Hindukush, A.D. 747: Sir A. Stein, 112*
Chin-sha-Kiang on early map of China, 260
Chirol, Sir V., India, Old and New, 302§
Chitral, Hunza and, Byways in: Brig.-Gen. G. K. Cockerill, 232 (*title only*)
Chomolhari peak, Tibet, 86
Chomo-lönzo, Tibetan name for Makalu, 95
Chomo-lungma, Tibetan name for Mt. Everest, 89, 462
Chowra Id., Nicobars, 40–46, 49
Chudeau, R., obituary, 78
Chumbi Valley, Tibet, 85
Close, Col. Sir C., remarks on "Archæology and Ordnance Survey," 253, 258
Cockerill, Brig.-Gen. G. K., Byways in Hunza and Chitral, 232 (*title only*)
Coconut currency in Nicobars, 42
Collie, J. N., remarks on "Mt. Everest Expdn.," 111
Colour Photography, 172
Commercial Geology, World Atlas, 214§
Compiègne forest and Cæsar's campaign, 205
Co-ordinates, Factors for converting Rectangular to Geodetic, etc.: C. E. Tildesley, 211§
Coquilhatville, Equat. Africa, Seasons at, 53
Corbin, P., stereographic survey, 273 *sqq.*
Correus, Bellovacan general, 197 *et seq.*
Cotton, World's supply of, W. H. Himbury on, 222§
Crawford, O. J. S., Archæology of Ordn. Survey Maps, 245*, 152 (*title only*)
Cronshaw, H. B., Petroleum, 213§
Croydon Nat. Hist. and Scient. Soc., Descripn. of Region. Surv. of: C. C. Fagg, 320 (*title only*)
Cumberland Gulf, Baffin Id., 269
Curzon, Lord, on Lurs, 340

D.

DADABAD plateau, Luristan, 443
Dahana sand ridge, Arabia, 327–328
Dakhila, Sudair village, Arabia, 332
Dalai Lama, permission to approach Mt. Everest, 81–82
Dalich pass, Luristan, 441
Dames, M. L., Book of D. Barbosa, 299§
Dampier's visit to Shompen, Nicobars, 44
Dang La Mts., continuation, 3–4
Danish Expedns. in Arctic N. America, 72
D'Anville's map of China, 260 *et seq.*
Darfur–Wadai Boundary, 72
Darkot glacier pass, Hindukush, 112, 113, 125, 126
Dar Masalite, free state, Sudan, 234
Debenham, F., remarks on "Photographic Equipment for Travellers," 178
De Bode, Baron, in Luristan, 339, 342
De Filippi Expedn.: Expln. of Upper Yarkand Valley, 1914: Lt.-Col. H. Wood, 375*
Dege, E. Tibet, valleys of, 11
Deir-ez-Zor, position, 457
Delany, M. C., History of Wealden Iron Industry, 463§
Demangeon, A., on French Iron Industry at close of 18th Century, 392§
De Morgan's journeys in Luristan, 339, 342
Denchin Gomba monastery, Tibet, 5
Deville, method of phototopography, 274
Dickson, H. N., obituary, 478
Diguedada, Kanem, 242
Dirakvand tribe, Luristan, 346
Dixey, F., Physiography of Sierra Leone, 80 (*title only*)
Dixon, Capt. C. C., on Sargasso Sea, 476
Dizful, Luristan, 437
Dje Chu river, Tibet, 9
Donka monastery, Tibet, 86
Dougherty and Nimrod Ids. in S. Pacific, Unsuccessful search for, 149
Doughty, C. M., on Rumma Wadi, 408
Douglas, Gen. J. A., remarks on "Luristan," 452
Drayü Gomba, monastery, Tibet, 14
Dreyer, Prof., on oxygen administrn., 382
Dryer, C. R., on Erie and Michigan Canal, 312§
Duckworth, Dr., remarks on "Archæology and Ordnance Survey," 255
Dufferin, Lord, visit to Jan Mayen, 185
Dug Pass, Tibet, 86
Dunlop, W. R., on Developt. of British Honduras, 473§
Durand, Sir M. and Lady, journey in Luristan, 339, 342
Dutch discovery of Jan Mayen, 182
—— East Indies, Danish-Swedish Tropical Station, 76
—— Expln. in New Guinea, 397§
Dutreuil de Rhins, book on Centr. Asia, 261
Dza Chu river, Tibet, 8
Dzakar Chu, Arun river system, 420
Dzin Chu, river, E. Tibet, 12
Dzogang, E. Tibet, 14
Dzogchen monastery, Tibet, 6

E.

EARTH's Crust, Chemistry of, H. S. Washington on, 74§
Eaux Souterraines, Nouveau Traité des: E. A. Martel, 391§
Edge, T., on discovery of Jan Mayen, 181
Edmonds, C. J., Luristan, 152 (*title only*), 335*, 437*
Egg Bluff, Jan Mayen, 185, 190
Ekerold, wireless station, Jan Mayen, 187, 193
Elephant grass for paper making, 224
Elles, G. L., Study of Geological Map, 144§
Elwell-Sutton, Lieut. Comm. A. S., Navigation of Tigris, 400 (*title only*)
Equatorial Africa, Notes on Seasons in: F. W. H. Migeod, 52*

Erie and Michigan Canal, C. R. Dryer on, 312 §
Eskimo in Labrador, 159, 161
Etumbi, Equatorial Africa, seasons at, 53
Euphrates Valley, Survey of, etc. : Major C. G. Lewis, 453 *
Europe, History of Climate in, C. E. P. Brooks on, 218 §
European Archæology, Text-book of : R. A. S. Macalister, 298 §
Evans, Capt. E. G. R., South with Scott, 211 §
———, J. W., on "Archæology and Ordnance Survey," 256, 479 ; on "Photographic Equipment, etc., for Travellers," 179 ; on "Recent Journey to N. Labrador," 168
Everest, Mt.— Expedn., 50, 207, 379 ; ditto, Lt.-Col. C. K. Howard-Bury, 81 *, 152 (*title only*) ; The Reconnaissance : G. L. Mallory, 100 * ; Geol. Results : A. M. Heron, 400 (*title only*), 418 * ; Maps and photographs, 131. Country and People : Lt.-Col. Howard-Bury, 480 (*title only*) ; Mt. E— Book, 459 § ; Pictures from Mt. E—: Sir F. Younghusband, 152 (*title only*) ; stereographic survey method for Mt. E— region, 278

F.

Fagg, C. C., Regional Survey of Croydon Nat. Hist. Soc., 320 (*title only*)
Falconer, J. D., Geology of Plateau Tinfields, 387 §
Fardivan cold spring, Luristan, 353
Farrer, R., Rainbow Bridge, 62 §
Fawcett, C. B., History of Port of London : Sir J. G. Broodbank, 462 §
Feilden, Col. H. W., visit to Zivolka Fjord, Novaya Zemlya, 373
Fendall, Brig.-Gen. C. P., East African Force, 1915–1919 .. 302 §
Fiji : its Problems and Resources : Major W. A. Chapple, 66 §
Florida, Central, R. M. Harper on, 146 §
Forbes, H. O., Last Days in New Guinea : Capt. C. A. W. Monckton, 389 § ; Topography of Cæsar's last campaign against Bellovaci, 195 *
Fordham, Sir H. G., Catalogue des Guides-Routiers, etc., 137 § ; Earliest French Itineraries, 137 § ; Early French Atlases, 1594–1637 .. 60 § ; Maps : Their History, etc., 67 §
Fort Hall, Equat. Africa, seasons at, 54
Fotherby, R., early visit to Jan Mayen, 182
Fox, C., S. remarks on "Geol. Results of Mt. Everest Expedn.," 431, 433, 434
France, Géogr. Humaine de la : J. Brunhes, 296 § ; Géologie de la : L. de Launay, 383 § ; Régions géogr. de la France : E. de Martonne, 464 § ; Rainfall of, A. Angot on, 69 §
Freeston, C. L., Geography as taught, 150
French in Wadai, 233 *et seq.*
French Atlases, Early, 1594–1637 : Sir H. G. Fordham, 60 §
——— Iron Industry at close of eighteenth century, Prof. Demangeon on, 392 §
——— Itineraries, Earliest : Sir H. G. Fordham, 137 § ; Catalogue des Guides-Routiers, etc. : *Id.*, 137 §
Freshfield, D. W., obituary of Viscount Bryce, 315
Fur Trade of America : A. Laut, 64 §

G.

Ganges, sources of, 267
Gartok river, E. Tibet, 15
Gascogne, Mém. sur Dunes : E. et J. Harlé, 385 §
Gaselee, S., Alphabets of Foreign Languages, reviewed by, 306 §
Gathorne-Hardy, G. M., Recent Journey to N. Labrador, 80 (*title only*), 153 *
——— ———, Hon. R., remarks on "Recent Journey to N. Labrador," 168
Gatine, A., remarks on "Mount Everest Expedn.," 111
Gaurisankar, as alternative name to Mt. Everest, 137 ; G—, peak, Himalayas, 93
Geographical Names, Permanent Committee, 457
Geographic Positions, Relation between Rectangular Co-ordinates and : W. F. Reynolds, 211 §
Geography as taught, C. L. Freeston, 150
———, Physical, Economic, Regional : J. F. Chamberlin, 143 §
——— ———, Political, Problems in : I. Bowman, 215 §
——— ——— and Hist. Geogr. : J. F. Unstead, 55 §
Geological Congress, Internat., 398
——— Maps : G. L. Elles, 144 §
——— Results of Mt. Everest Expedn. : A. M. Heron, 418 *
Geophysical Papers, 477
Geophysics—Evidence of True N. and S. Directive Force in Atmosphere : E. A. Reeves, 480 (*title only*)
George river, Labrador, raised beaches, 157
Ghuraz Mts., Luristan, 450
Gilgit river, Hindukush, 128
Glaciation of Chinese Tibet : F. K. Ward, 363 *
Glaciers, Climatological significance, 278
Gleichen, Maj.-Gen. Lord E., appeal for Perm. Com. Geogr. Names, 457
——— ——— ——— ——— and Reynolds, J. H., Alphabets of Foreign Languages, etc., 306 §
Godwin-Austen, Col., Portfolio of Indian sketches missing, 219
Gouran Arabs, Wadai, 241
Graham, R. B. C., Mogreb-el-Acksa : Journey in Morocco, 210 §
Grandidier, A., obituary, 77
Grant, C. F., Studies in N. Africa, 209 §
Gravier, G., Shumadia, or "Forest" of Serbia, 144 §

Greenland Norse colony, 167
Gregory, J. W., Rift-valleys and Geology of E. Africa, 141 §
Grenfell mission, Labrador, 154
Gulban ibn Towala, Arabia, 327
Gurla Mandhata, in early Chinese edict, 262

H.

Hafar wells, Arabia, 326
Hall, T., Californian Trails, etc., 142* §
Hanifa, Wadi, Arabia, 334, 402, 405
Hanoteau and Letourneux, on Algerian water rights, 27
Haraimla, Arabia, 403
Harding-King, W. J., on Algerian water-clocks, 28
Harker, Capt. F., obituary, 400
Harlé, E. and J., Mém. sur Dunes de Gascogne, 385 §
Harper, R. M., on Central Florida, 146 §
Hasanvand tribe, Luristan, 346
Hasi wells, Arabia, 333
Hassun, Sudair village, Arabia, 332
Hausa pilgrims, Wadai, 239–240
Hauta, Sudair village, Arabia, 332
Haverfield, F. J., on British antiquities, 245
Hay, Capt. W. R., Two Years in Kurdistan, 60 §
Hayden, Sir H., Geol. work in Tibet, 419 *et seq.*; remarks on "Journeys through Kam," 17
Hayyaniya, Arabia, 411
Health at high altitudes, 107–108
Hedin, S., on source of Tsang-po, 262; ditto of Brahmaputra, Sutlej, and Indus, 266, 267
Hei-shui, or Black Water, on early map of China, 260
Hejaz Railway, 417
Henrici, Major, remarks on "Stereographic Survey," 291
Herodotus on worship of Athena, 33
Heron, A. M., and Everest Expedn., 82, 90; Geol. Results of Mt. Everest Expdn., 400 (*title only*), 418*
Hilton-Simpson, M. W., Among Hill-folk of Algeria, 303 §; Infl. of Geogr. on People of Aures Massif, Algeria, 19*, 79 (*title only*)
Himalayan nomenclature, 133–134
Himbury, W. H., on Cotton Supply, 222 §
Hindukush, Pamirs and, Chinese Expedn. across: Sir A. Stein, 112*
Hinks, A. R., Stereographic Survey, 273*; remarks on "Geol. Results of Mt. Everest Expedn.," 432; on "Photographic Equipment, etc., for Travellers," 179: *see* MacLeod, Lt.-Col. M. N.
Hirtius on Bellovacan Campaign, 195 *et seq.*
——— Research, Inst. of, Univ. of London, 224
Hoare, Sir R. C., Archæological work, 246
Hogarth, D. G., on importance of Riyadh, Arabia, 401
Holmes, T. R., on Bellovacan Campaign, 195 *et seq.*
Holtedahl, O., Crossing of Novaya Zemlya, 376*
Hön La pass, E. Tibet, 11
Hoolah, Arabia, 403
Hormuz, Persian leader, 326
Howard-Bury, Lt.-Col. C. K., Mt. Everest Expedn., 81*, 152 (*title only*); Mt. Everest Country and People, 480 (*title only*); Founder's Medal to, 308
——— ——— and others, Mt. Everest: The Reconnaissance, 1921 ..459 §
Huber, C., murder of, at Medina, 407; route of, 410
Hubl, Gen. von, method of phototopography, 274
Hudson and discovery of Jan Mayen, 182
Hugershoff, R., inventor of auto-cartograph, 284 *et seq.*
Huk, Wadai, 241
Hunza valley, Hindukush, 128–129
——— and Chitral, Byways in: Brig.-Gen. C. K. Cockerill, 232 (*title only*)
Hurud district, Luristan, 446, 447
Hutton, J. H., Angami Nagas, etc., 209 §
Huweitat tribe, Arabia, 413
Hydrographic Bureau, Internat.: Capt. G. Spicer-Simson, 293

I.

Ibn Rashid, 411–412
—— Saud, Emir, 325
Ibrahim Pasha, campaign against Wahabis, 332
Igluliut Eskimo, Baffin Id., 272
Illinois, Geogr. of: D. C. Ridgley, 210 §
Imaos Mts. in Ptolemy, 117
India, Women of: O. Rothfield, 387 §
——, Old and New: Sir V. Chirol, 302 §
——, South, Civilian's, 386 §
'Indian Antiquary,' 224
Ipa La Mts., E. Tibet, 10
Ireland, Memoir on Coalfields, 60 §
Irrawaddy, sources of, on early map of China, 261–262
Irumu, Equat. Africa, seasons at, 54
Italian General Atlas, Proposed, 75

J.

Jack, Col. E. M., remarks on "Stereographic Survey," 289
——, R. L., obituary, 318
Jalajil, Sudair village, Arabia, 331
Jan Mayen, 475; ditto, etc.: J. M. Wordie, 80 (*title only*), 180*
Jang, K. B. S., Back Grant to, 309
Jauf oases, Arabia, 413
Jebbul salt lake basin, Mesopotamia, 456
Jefferson, M., on colonizn. in Chile, 396 §
Jelep La pass, Sikkim–Tibet, 85
Jellal, Aures Massif, 25
Jemora desert valley, Aures Massif, 21

Jenkins, J. T., History of Whale Fisheries, 307 §
Joelson, F. S., Tanganyika Territory, etc., 63 §
Johnson's Ascents in K'un-lun, K. Mason on, 310 §
Johnson, D. W., Battlefields of Great War, 139 §
Johnston, Sir H. H., In Heart of Bantuland : D. Campbell, 388 §; obituary of Sir John Kirk, 225
Jordan, Nile and : G. A. F. Knight, 212 §
Jugurtha's stronghold, Sallust on, 25
Jumbra, Zilfi, Arabia, 329
Jyekundo village, E. Tibet, 7

K.

KABETE, Equat. Africa, seasons at, 54
Kailas, Mt., in Chinese edict, 262, 263
Kalaw Long, river, Irrawaddy system, 262
Kam, Journeys through : E. Teichman, 1 *
Kama valley, Himalayas, beauty of, 95
Kambawa race, 2
Kampa Dzong, Tibet, 87
Kampala, Equat. Africa, seasons at, 54
Kanem, fertile water-hole, valleys of, 242
Kangdoshung glacier, Himalayas, 95
Kang Hsi's Edict on Mts. and Rivers of China : W. R. Carles, 258 *; ditto, erratum, 398
Kango, Equat. Africa, seasons at, 52
Kang-ti-ssu, identificn. with Mt. Kailas, 262
Kansir, fort, Hindukush, 122-123
Kansu Mohammedans, 3
Kao-Hsien-chih, Korean general, expedn., 116 *et seq.*
Kara or Hara Nor, lake, Tibet, 261
Kara-ussu, river, on D'Anville's map of China, 261
Kashgan river, Luristan, 449-450
Kasim, northern, Arabia, 409
Kasr Ballal, remains at, Arabia, 326
Kellas, A. M., death of, 87
Kereinik, British Military Post, Darfur frontier, 233
Khabra el Wadi, Arabia, 408
——— Musawil, Arabia, 415
Khailas, Mt., identity with Kang-ti-ssu, 262 ; scenery of, 263
Khans of Lur tribes, 346
Kharta valley, Tibet, 93, 94
Khombu Pass, Tibet–Nepaul, 91
Khurramabad, Luristan, 340, 443–444
Kilimanjaro, Ascent of, 395
Kinematography for travellers, 178
King, H., remarks on "People of Aures Massif, Algeria," 34
Kirk, Sir John, obituary, 225
Kishmahar plain, Luristan, 450
Kisumu, Equat. Africa, seasons at, 54
Kivalek, Eskimo settlmt., Labrador, 163
Kivu Lake region, Swedish Expedn., 472
Klagenfurt Plebiscite : R. Bryce, 480 (*title only*)
Knight, G. A. F., Nile and Jordan, 212 §
Knox's route across Arabia, 322 *et seq.*
Knudsen, J., Søkortdiretør Jens Sørensen, etc., 208 §
Kolhschütter, E., gravity obsns. in Germ. E. Africa, 151
Kuh-i-Dasht, plateau, Luristan, 450
K'un-lun, Johnson's Ascents in, K. Mason on, 310 §
Kurdistan, Two Years in : Capt. W. R. Hay, 60 §
Kus peak, Luristan, 442
Kuttite, Secrets of : Capt. E. O. Mousley, 465 §

L.

LAAB, J. J., on eruption in Jan Mayen, 184
Labrador : W. B. Cabot, 468 §
———, N., Recent Journey to : G. M. Gathorne-Hardy, 80 (*title only*), 153 *
Lagang Tso, lake, 262, 398
Lagen La Glacier, source of Irrawaddy, 262
Lakki dialect, 340
Languages, Foreign, Alphabets of, etc. : Maj.-Gen. Lord E. Gleichen and J. H. Reynolds, 306 §
Lartigue, Col., on Algerian water rights, 27
Latin Orient, Essays on : W. Miller, 138 §
Launay, L. de, Géologie de la France, 383 §
Laussedat, Col., method of phototopography, 274
Laut, A., Fur Trade of America, 64 §
Lauzanne, Commdt., expedn. in W. Sahara, 220 §
Layard's journey in Luristan, 339
Leachman, Capt., Arabian journeys, 324
Lefargue, Commdt., leader of motor expedn. across Sahara, 72
Lefèvre, M., on Forms of Settlemt. in Belgium, 70 §
Leffingwell, E. de K., Patron's Medal to, 309
Letourneux : *see* Hanoteau
Lewis, Major C. G., Survey of Euphrates Valley from Deir-ez-Zor to Aleppo, 453 *
Lien-yün (Sarhad), Oxus river, 117, 119, 120, 122
Libreville, Equat. Africa, seasons at, 52
Litang river, Chinese Tibet, 364
Loashi Valley, Mokoto Lakes, 359
London, History of Port of : Sir J. G. Broodbank, 462 §
———, Influence of Geogr. on developt. of : C. E. N. Bromehead, 320 (*title only*)
Lorimer, D. L. R., Journey in Luristan, 339
Lukulu, Mokoto lakes, 359
Luri dialect, 340
Luristan, etc. : C. J. Edmonds, 152 (*title only*), 335 *, 437 *
Lyde, L. W., Review of New World : Problems in Polit. Geog. : I. Bowman, 215 §; ditto of Régions géogr. de la France : E. de Martonne, 464 §

M.

MAANTHINLE remains in Uganda, E. J. Wayland on, 231

Mabang or Mansarowar, lake, in early Chinese edict, 282, 398
Macalister, R. A. S., Text-Book of European Archæology, 290 §
McCaw, G. T., remarks on "Stereographic Survey," 290
MacLeod, Lt.-Col. M. N., Stereographic Survey, 232 (*title only*), 284 *
Madhua sand-belt, Arabia, 328
Madras, Some Places and People in, 386 §
Magera Lake, Rift Valley, 358, 362
Mainwaring, Brig.-Gen. H. G., obituary, 379
Makalu, peak, Himalayas, 95
Makoku, Equat. Africa, seasons at, 53
Makwa, Equat. Africa, seasons at, 53
Malham shaib, Arabia, 402–403
Mali Kha, confluent of Irrawaddy, 262
Mallory, G. L., Mt. Everest: The Reconnaissance, 100 *, 152 (*title only*)
Maniak Chyok: *see* Baian Kara, 260
Mansarowar, Lake, 262, 398; not source of Ganges, 267
Map of World, 1/M, 73 §
Maps: Their History, etc.: Sir H. G. Fordham, 67 §
Margerie, E. de, account of stereographic surveys, 273
Margoliouth, D. S., on Sabæan inscriptns., 322–323
Markam region, E. Tibet, 15
Marmaduke, T., and discovery of Jan Mayen, 183
Martel, E. A., Nouveau Traité des Eaux Souterraines, 391 §
Martin, P. F., Sudan in Evolution, 388 §
Martonne, E. de, Régions géogr. de la France, 464 §
Masisi, Mokoto Lakes, 357, 358
Mason, Major K., on Johnson's ascents in K'un-lun, 310 §
Matochkin Strait, Nov. Zemlya, 370, 375
May, J. J., discoverer of Jan Mayen, 182
Meakin, B., on N. African water-clocks, 29
Mekong River and Valley, 1, 9, 15
Mekong–Salween Divide, F. Kingdon Ward on, 231
Melland, F. H., Cuthbert Peek Grant to, 309
Mena'a, Aures Massif, 21
Mercanton, —, ascent of Beerenberg, Jan Mayen, 188
Meru: *see* Sumeru
Meruti, Mokoto Lakes, 362
Meskeneh, Euphrates, position, 457
Meyadin, Euphrates, position, 457
Michigan and Erie Canal, C. R. Dryer on, 312 §
Migeod, F. W. H., Notes on Seasons in Equatorial Africa, 52 *
Miller, W., Essays on Latin Orient, 138 §
Mineral Production, Distribn. of, 214 §
Min river and mts., China, 260
Missouri, Geogr. of Ozark Highland of: C. Sauer, 55 §
Mogreb-el-Acksa: Journey in Morocco: R. B. C. Graham, 210 §
Mohn, —, visit to Jan Mayen, 185
Mokoto Lakes, W. Rift Valley: T. A. Barns, 356 *
Mombasa, seasons at, 54, 55
Monckton, Capt. C. A. W., Last Days in New Guinea, 389 §
Mongolian Plains, Across: R. C. Andrews, 301 §
Monkeys in Tibet, 9
Montgomerie, H. S., Nicobar Ids., 36 *
Moravian Mission, Labrador, 154; Nicobars, 37
Morocco, Journey in: R. B. C. Graham, 210 §
Morshead, Major H. T., Mt. Everest surveys, 82, 131–132
Motya, a Phœnician colony in Sicily: J. Whitaker, 138 §
Moule, A. C., on Friar Odoric, 478 §
Mousley, Capt. E. O., Secrets of a Kuttite, 465 §
Mudhnib, Arabia, 407
Mughila, Sudair village, Arabia, 332
Mules in Everest Expedn., 84
Muli, Chinese Tibet, 364
Müller, Capt. S. H., elected to Directing Board Intern. Hydrogr. Bureau, 296
Mungarreh, Luristan, tour in, 349
Munn, H. T., Econom. Life Baffin Isd. Eskimo, 269
Mussuro, Wadai, 241
Mweso river, Mokoto lakes, 359
Myres, L. J., remarks on "People of Aures Massif, Algeria," 34

N.

Nafud Batra sands, Arabia, 405
——— Desert, Great, Arabia, 325, 409, 413
——— Dhuwaihi, sand ridge, Arabia, 329
——— es Sirr, sand-barrier, Arabia, 406
——— Shakri, sand-belt, Arabia, 404
Nagchu: *see* Yalu
Nain, Labrador, longitude, 159
Nain Singh, on hydrology of Nak Chu basin, 261
Nak Chu, river, or Kara-ussu, 261
Namlagira volcano, Cent. Africa, 359
Nancowry id., Nicobars, 40, 41, 46
Nangchen, E. Tibet, 8
Nansen, F., on identity of "Svalbard" coast, 181
Narwhal in Baffin Id., 271
Nawadhir sands, Arabia, 410
Nazar Ali Khan, chieftain, Luristan, 449
Ndalala, Mokoto Lakes, 359, 360
Nettilling Lake, Baffin Id., 269
New Guinea, Dutch Expln. in, 397 §
——— ———, Last Days in, etc.: Capt. C. A. W. Monckton, 389 §
Newton, A., Life of: A. F. R. Wollaston, 305 §
New World: Problems in Polit. Geog.: I. Bowman, 215 §
Ngom Chu river, Tibet, 9
Ngolo nomads, Tibet, 5
N'Guri fort, Kanem, 242

Nicobar Ids. : H. S. Montgomerie, 36*
Nigeria—Geology of Plateau Tinfields : J. D. Falconer, 387§
Nile and Jordan, etc. : G. A. F. Knight, 212§
Nimrod and Dougherty Ids. in S. Pacific, Unsuccessful search for, 149
Ninagongo volcano, Cent. Africa, 362
N'mai Kha, confluent of Irrawaddy, 262
Noel, Capt. J. B. L., Some Notes on Photographic Equipment and Methods for Travellers, 80 (*title only*), 169*
Nolde, Baron E., visit to Sirr depression, Arabia, 406
Nomokhun-ubashi range, in early Chinese edict, 259
Norse Discoveries of America, etc. : G. M. Gathorne Hardy, 65§
Norwegian coast, compared with Labrador, 154
——— Minister, H. E., remarks on "Jan Mayen Id.," 194
Nou-kiang, river, of D'Anville, 261
Novaya Zemlya, Crossing of : O. Holtedahl, 370*
Nyanam Valley, Himalayas, 91
Nya-rong : *see* Yalu

O.

ODORIC, Friar, A. C. Moule on, 478§
Oir Chu, river, of D'Anville, 261
Oldham, R. D., on African Rift Valleys, 151
Ong Chu river, affl. of Yangstze, 10
Oprang river, Karakoram, sources, 376, 378
Ordnance Survey Maps, Archæology of : O. G. S. Crawford, 152 (*title only*), 245*; ditto, J. W. Evans on, 479
Orel's stereoautograph, 274, 284
Orient, Latin, Essays on : W. Miller, 138§
Oso Valley, Mokoto Lakes, 359
Ostrich, Arabian, 412
Ototzky, P., on source of Underground Waters, 148§
Oxus, summer flood of, 122
Oxygen equipment, Everest Expedn., 380 *et seq.*
Ozark Highland of Missouri, Geogr. of : C. Sauer, 55§

P.

PALGRAVE on Tuwaik plateau, Arabia, 330, 331
Pamirs and Hindukush, Chinese Expedn. across : Sir A. Stein, 112§
Paper making, Elephant grass for, 224
Papi road, Luristan, 336
Parker, E. H., on course of Salween, 266
Parkyn, E. A., review of Macalister's European Archæology, 298§
Parry, Sir J., elected to Directing Board, Intern. Hydrog. Bureau, 296
Pascoe, E. H., remarks on "Geol. Results of Mt. Everest Expedn.," 435
Pavlov's crossing, Novaya Zemlya, 375
Pearson, H. J., visit to Zivolka Fjord, Novaya Zemlya, 373
Permanent Committee on Geographical Names, 457
Persian Government and Luristan, 336
Persia, Recent Happenings in : Hon. J. M. Balfour, 466§
Petroleum : H. B. Cronshaw, 213§
Phaff, Adm. J. M., elected to Directing Board Intern. Hydrogr. Bureau, 296
Phari, Tibet, 86
Phenology, British, and Climate, E. J. Salisbury on, 309§
Phillips, P. L., on Washington as surveyor and map-maker, 147§
Photographic Equipment and Methods for Travellers, Some Notes on : Capt. J. B. Noel, 80 (*title only*), 169*
——— survey, origin of, 133
Photography, Panoramic, 173
Pinerolo Fair, Geogr. conditions of : G. B. Roletto on, 393§
Ping Lang, early name for Irrawady, 261
Piracy in Nicobars, 37
Pish-i-Kuh : C. J. Edmonds, 152 (*title only*) 335,* 437*
Pitkar, Hindukush, 121, 122
Pol̂e (Solê), Ab-i-Panja branch of Oxus, 117
Political Geography, Problems in : I. Bowman, 215§
Ponting, H. G., Great White South, 143§, 222
Popti La pass, Himalayas, 96
Port Burwell, Labrador, 158
Principe Id., W. Equat. Africa, seasons at, 52
Pritchard, Capt. B. S. A., expln. of Irrawaddy, 262
Pulfrich, inventor of stereocomparator, 274
Puneh pass, Luristan, 446
Pusht-i-Kuh, Luristan, 335 *et seq.*

Q.

QALAVAND road, Luristan, 337
Quannersted's visit to Jan Mayen, 185
Quayle, E. T., on Possibility of increasing Rainfall in S.E. Australia, 474§
Quest, Voyage of, 475

R.

RABINO, H. L., journey in Luristan, 340
Rainbow Bridge : R. Farrer, 62§
Rakas Tal : *see* Lagang Tso
Raqqa, Euphrates, position, 457
Ras Tageshrirt ridge, Aures Massif, 21
Rasira, Wad, Aures Mtns., 21–22
Raudah, Sudair village, 332
Raunkiaer's Arabian journeys, 324
Rawlinson's journey in Luristan, 339, 342
Read, Sir H., remarks on "Archæology and Ordnance Survey," 254
Recollections of Adventures, etc. : H. W. Struben, 467§

Reed, F. R. C., Geology of British Empire, 68 §
Reeves, E. A., Evidence of True N. & S. Directive Force in Atmosphere, 480 (*title only*)
Reichert, F., Glacier Explns. in S. Andes, 396 §
Renaud, J., French Hydrographer, 293
Reynolds, J. H.: *see* Gleichen, Maj.-Gen. Lord E.
——, W. F., Relation between Plane Rectangular Co-ordinates and Geogr. Positions, 211 §
Richardson, J., on N. African water-clocks, 29
Ridgley, D. C., Geography of Illinois, 210 §
Rift Valleys and Geology of E. Africa: J. W. Gregory, 141 §
Rijnhart's journey in Tibet, 8
River names of Tibet, 10
Riwoche River, E. Tibet, 13
Riyadh, Arabia, 401
Roget, S. R., Travel in the two last Centuries of Three Generations, 213 §
Roletto, G. B., on geogr. conditions of Pinerolo Fair, 393 §
Ronaldshay, Lord, and Himalayan Expedn., 83
Rongbuk— East and West glaciers, 135–136; Valley, geology, 423
Rongme gorge, Yaru Chu river, Arun system, 421
Rongshahr Valley, Himalayas, 91, 92
Roscoe, J., Twenty-five Years in East Africa, 140 §
Rose, A., remarks on "Journeys through Kam," 16
Rothfield, O., Women of India, 387 §
R.G.S., Medals and Awards, 308; Meetings and Elections, 79, 151, 400, 480; Old Bindings in the Society's Library, 313; Lord E. Gleichen's appeal to, 458
Rubat brine springs, Luristan, 445
Rû de Berne, stream, N.E. France, 199
Rumma, Wadi er, Arabia, 324–5, 408
Russanov, crossing of Novaya Zemlya, 375
Ryder, Col., Tibetan surveys, 131

S.

Sabæans in N.E. Arabia, 322–323
Sadlier's itinerary in Arabia, 406
Sagvand tribe, Luristan, 347
Sahara— Motor Expedn. across, 72; Western, French Expln., 220 §
Saimarreh river, Luristan, 451; road, 337
Salisbury, E. J., on British Phenology and Climate, 309 §
Sallust, on a Numidian stronghold, 25
Salween River, sources of, 260, 261
San Wei, Kansu, 268
Saqiyas, irrign. channels, Algeria, 27 *sqq.*
Sargasso Sea, Capt. Dixon on, 476
Sarhad (Lien-yün), Oxus river, 117, 119, 120, 122
Sarikol valley, Pamirs, accounts of, 117
Sartip Khan, Sagvand chief, Luristan, 437
Sauer, C., Geogr. of Ozark Highland of Missouri, 55
Saussure, L. de, on Si Wang Mu legend, 263
Sawyer, Major, journey in Bakhtiari, 339
Schindler, Gen. Sir A. H., journey in Luristan, 339
Schunenann's journey in Luristan, 339
Schwarz, E. H. L., South African Geography, 140 §
Scoresby's account of Jan Mayen, 185
Scott, South with: Capt. E. G. R. Evans, 211 §
Scutt, W., remarks on "Photographic Methods, etc., for Travellers, 178
Seal in Baffin Id., 269 *et seq.*
Sedov Expedn., Novaya Zemlya, 375
Serbia, Shumadia or "Forest" of, G. Gravier on, 144 §
Serindia, etc.: A. Stein, 385 §
Seshü Gomba monastery, Tibet, 6
Shackleton, Sir E. H., obituary, 228; funeral, 477; memorial service, 313
Shakespear's, Capt. W. H. I., last journey: D. Carruthers, 321,* 401 *
Shakh depression, Arabia, 325
Shakra oasis, Arabia, 404
Shaktur boats, Euphrates, 456
Shamaliya, Zilfi, Arabia, 329
Shammar princes, 411, 413
Sharpe, Sir A., remarks on "Across Wadai," 244
Shawia of the Aurès Mts., Journeys among: M. W. Hilton-Simpson, 303 §; their hamlets, etc., 22 *et seq.*; industries, etc., 29–33
Shazadeh Muhammad shrine, Luristan, 450
Shekar Dzong monastery, Tibet, 89
Sherpa Bhotia coolie, 83
Sherrarat tribe, Tubaik, Arabia, 416
Shershar, Jebel, Algeria, 20
Sholo gorge, Chinese Tibet, 364
Shompen id., Nicobars, 41, 44, 45, 46, 47, 49
Shove volcano, Cent. Africa, 362
Shumadir or "Forest" of Serbia, G. Gravier on, 144 §
Shyok and Yarkand rivers, sources of, Karakoram, 376
Sierra Leone, Physiography: F. Dixey, 80 (*title only*)
Sievers, W., obituary, 79
Sikkim, climate and vegetation, 84
Sinclair, J., remarks on "Photographic Equipment, etc., for Travellers," 178
Sirhan depression, Arabia, 415
Sirr saline depression, Arabia, 406
Si Wang Mu, Chinese goddess, 263
Societé Asiatique, 398
Sørensen, Jens, Søkortdirectør, etc.: J. Knudsen, 208 §
South, Great White: H. G. Ponting, 143 §
——— with Scott: Capt. E. G. R. Evans, 211 §

Spicer-Simson, Capt. G., Intern. Hydrographic Bureau, 293
Spitsbergen and identity of "Svalbard," 181
Steel, Lt.-Col. E. A., memoir of: Col. J. P. Steel, 306 §
Stefansson, V., Friendly Arctic, 469 §
Stein, Sir A., Chinese Expedn. across Pamirs and Hindukush, 112 *; Serindia, etc., 385 §
Stereographic Survey: A. R. Hinks; Lt.-Col. M. N. MacLeod, 232 (*title only*), 273 *, 284 *
Stone Circles, 252
Struben, H. W., Recollections of Adventures, etc., 467 §
Stukeley's names of Roman roads, 248
Sudair villages, Tuwaik plateau, Arabia, 330–332
Sudan in Evolution: P. F. Martin, 388 §
Suessiones, 196 *et seq.*
Sulaiy, Wadi, Arabia, 333
Sumeru, Mt., Tibet, 263
Sumner, H., Archæological work, 247
Sutlej, source of, 266
Sutton, J. R., on Rainfall of S. Africa, 472 §
"Svalbard," identity of, 181
Sweden, on distribn. of Arable Land, etc., in, 393 §
Swedish Expedn. to Lake Kivu, 472
Sykes, Miss E., Ride on Roof of World, 152 (*title only*)
——, P. M., Two Years in Kurdistan: Capt. W. R. Hay (review), 60 §
Szechwan, deglaciation in, 367
Szechwanese unadapted to Tibet, 3

T.

TABERDGA, Aures Massif, 25
Taf, Lauristan, 445
Talon, Col., stereographic surveys, 273 *et seq.*
Tamair, Sudair village, Arabia, 331
Tanam, Mt., Luristan, 441
T'an-chü, Mt., identity with Darkot, 126–7
T'ang Annals, 126–127
Tanganyika Territory, 71 §; ditto, etc.: F. S. Joelson, 63 §
Tang-i-Kuliab, gorge, Luristan, 351, 353
Taping, confluent of Irrawaddy, 261
Taraba, Arabia, 411
Tarim Basin, early importance of, 114
Taron River, Irrawaddy system, 262
Tat-sang, Tibet, 87
Teichman, E., journey through Kam, 1 *; on branches of Upper Mekong, 266
Temple, R. C., Book of Duarte Barbosa: Ed. M. L. Dames, 299 §
Temperley, H., Geography of Treaty of Rapallo, 320 (*title only*)
Teressa id., Nicobars, 41, 42, 46, 49
Thadik, Arabia, 403
Thompson, Lieut. F. V., inventor of stereoplotter, 274
Thoroddsen, T., obituary, 399
Tibet, Chinese, Glaciation of: F. K. Ward, 363 *
——, Natural History of South-Western: A. F. R. Wollaston, 232 (*title only*)
Tibetan— animals, 4; forts, 123; hold on Central Asia, 115
Tigris Corps Map, etc., Correction to, 146
——, Navigation of, above Baghdad: Lt.-Comm. A. S. Elwell-Sutton, 400 (*title only*)
Tildesley, C. E., Factors for converting Rectangular to Geodetic Co-ordinates, etc., 211 §
Tingri, Tibet, 90, 93
Tinki, Ozong, fort, Tibet, 86–87
Tirso Reservoir Dam, Sardinia, 471
Travel in the two last Centuries of Three Generations: ed. S. R. Roget, 213 §
Travellers, Some Notes on Photographic Equipment and Methods for: Capt. J. B. L. Noel, 169 *
Treaty of Rapallo, Geography of: H. Temperley, 320 (*title only*)
Tropical Station in Dutch East Indies, Danish-Swedish, 76
Tsakolo brine wells, E. Tibet, 15
Tsangpo, River, 261–262
Ts'ung-ling mts., Pamirs, 116
Tubaik hills, Arabia, 325, 416
"Tunnit" extinct race, Labrador, problem of, 161–162, 164–167
Tunnu-me-muit Eskimo, Baffin Id., 269
"Turcs Occidentaux," quoted, 113 *et seq.*
Turko-Persian Boundary Commn., 1849.. 353
Turks, Conquest by Chinese, 8th century, 113–114
Tuwaik— plateau, Arabia, 329, 330, 403; settlemts., map of, 324
Tuwaim, Sudair village, Arabia, 331
——— el Aud, Sudair village, Arabia, 332

U.

UGANDA, Remains in, E. J. Wayland on, 231
Umm Hager, Wadai, 239
Underground Waters— Nouveau Traité des Eaux Souterraines: E. A. Martel, 391 §; P. Ototzky on source of, 148 §
Unstead, J. F., Geogr. and Hist. Geogr., 55 §
Urmah, Arabia, 333

V.

VALIZADEHS family, Khurramabad, Luristan, 444
Vesserean, M., on Sunny and Shady Sides of Alpine Valleys, 310 §
Virunga volcanoes, Cent. Africa, 359
Vogt, C., visit to Jan Mayen, 185
Vrolicq, J., and discovery of Jan Mayen, 183

W.

WAD Abdi, Aures Massif, 21
Wadai— Across: Sir P. Brocklehurst, 152 (*title only*), 233*; Darfur–W— Boundary, 72
Walrus in Baffin Id., 269 *et seq.*
Wanianga tribe, Mokoto Lakes, 357
War, Great, Battlefields of: D. W. Johnson, 139 §
Ward, Hon. E., Three Travellers in N. Africa, 210 §
———, F. K., Glaciation of Chinese Tibet, 363*; on Mekong–Salween Divide, 231
Washali chieftainess, Mokoto Lakes, 360
Washington, George, as surveyor and mapmaker, P. L. Phillips on, 147 §
———, H. S., on Chemistry of Earth's Crust, 74 §
Watembo tribe, Mokoto Lakes, 357
Water-clocks in Algeria, 28–29
Wayland, E. J., on Remains in Uganda, 231
Wealden Iron Industry, History of: M. C. Delany, 463 §
Weyprecht Glacier, Jan Mayen, 188
Whale Fisheries, History of: J. T. Jenkins, 307 §
Wheeler, Major, Mt. Everest surveys, 82, 91, 131–132
Whitaker, J., Motya, a Phœnician Colony in Sicily, 138 §
Wiese, crossing of Novaya Zemlya, 375
Wigram, Col., remarks on "Journeys through Kam," 18
Williams's journey in Luristan, 339
Wilson, Sir A., journey in Luristan, 339
Wilson-Fox, H., obituary, 150
Wineland Sagas: G. M. Gathorne-Hardy, 65 §
Witar, Shaib, Arabia, 332
Wollaston, A. F. R., Life of A. Newton, 305 §; Natural History of S.W. Tibet, 232 (*title only*); and Everest Expedn., 82, 91
Wood, Lt.-Col. H., Expln. of Upper Yarkand Valley, 1914, by De Filippi Expedn., 375*
Wordie, J. M., Jan Mayen Id., 80 (*title only*), 180*
World, 1/M Map, 73 §
——— Atlas of Commercial Geology, 214 §

Y.

Yabrin, Wadi, Arabia, 334
Yak for transport, 2
Yalung— Valley, E. Tibet, 5–6; River, on early map of China, 260
Yangtze, Upper, 6, 10; in early Chinese edict, 260
Yarkand Valley, Upper, Expln. by De Filippi Expdn., 1914: Lt.-Col. H. Wood, 375*
Yaru (Ko) Chu, Arun river system, 88, 420
Yasin, Hindukush, 127
Yellow River, in Kang Hsi's edict, 264
Younghusband, Sir F., American G. S. medal to, 477; Pictures from Mt. Everest, 152 (*title only*); remarks on "Across Wadai," 244; on "Geol. results of Mt. Everest Expedn.," 431, 434; on "Jan Mayen Id.," 195; on "Journeys through Kam," 18; on "Mt. Everest Expedn.," 109; on "Luristan," 451, 452; on "People of Aures Massif, Algeria," 34, 36; on "Photographic Equipment, etc., for Travellers," 180; on "Recent Journey to N. Labrador," 168; on "Stereographic Survey," 292
Yü, Great, Surveys by, 260 *et seq.*
Yu Chu— Valley, Tibet, confign., 3; River, 13–14

Z.

ZAL river, Luristan, 439
Zal bridge, Dalich road, Luristan, 337
Zanzibar Protectorate, 221 §
Zerud, Arabia, 410
Zikaibiya: *see* Khabra
Zilfi, Arabia, 329
Zivolka Fjord, Novaya Zemlya, 373
Zorgdrager, C. G., visit to Jan Mayen, 184
Zululand, N.E., Vegetation Belts, J. W. Bews on, 311 §

INDEX TO MAPS

EUROPE.

Supposed Theatre of Cæsar's Campaign against the Bellovaci, 198

ASIA.

Arabia, Northern, Shakespear's last journey, 400; Jauf el Amr, etc., 414
Everest Expedn.: Maps I. and II. Preliminary, 152; Map III. Geology of Mt. E— Region, from surveys by A. M. Heron, 480
Hindukush and Pamirs: Country between head of Oxus and Gilgit River, 113; Mtn. country betw. W. T'ien-Shan and Indus, 112
Karakoram: Upper Yarkand Valley, 377
Luristan: Sketch-map, 338; Portion of same, showing Mr. Edmonds' route, 440; Mungarreh, 351
Nicobar Islands, 38
Tibet: Part of Kam, by Eric Teichman, 80; Mtns. W. of Muli, from surveys by F. K. Ward, 364

AFRICA.

Aures Massif, Sketch-map, 20
Mokoto lakes, W. Rift Valley, 357
Wadai: Sketch-map of Sir Philip Brocklehurst's route, 237

AMERICA.

Labrador, Sketch-map, 155; Sketch showing Kanaistôk and other Tunnit Ids. in Nain District, 160

ARCTIC.

Jan Mayen Id., to illustrate paper by J. M. Wordie, 185
Novaya Zemlya: Sketch-map of Country betw. Mashigin and Zivolka Fjords, 373

ILLUSTRATIONS AND DIAGRAMS

ASIA.

Arabia, Northern: Captain Shakespear's journey, 328–9, 332–3, 404–5, 408–9, 412–13
Everest Expedn., 96–7, 420–1
Kam (Eastern Tibet), 4–5, 12–13
Luristan, 348–9, 355

AFRICA.

Aures Mtns., 21, 28–9, 32–3
Virunga Volcanoes and Lake Ndalala, 356
Wadai and Lake Chad, 240–1

AMERICA.

Labrador, 156–7, 164–5

ARCTIC.

Jan Mayen, 188–9

GENERAL.

Stereographic Survey, 276–7, 279, 281, 284–5, 288

END OF VOL. LIX.

PRINTED BY WILLIAM CLOWES AND SONS, LIMITED, LONDON AND BECCLES, ENGLAND.

THE LITTLE FAIRY OF GOOD HEALTH SAYS :—

"Keep cool and fresh and fit on the warmest days by wearing—

Reduced Prices

AERTEX

cellular

UNDERWEAR FOR MEN, WOMEN AND CHILDREN, SHIRTS, SHEETS, ETC

Look for the Aertex label on all genuine Aertex goods —refuse imitations.

A selection from list of Depots where Aertex Cellular Goods may be obtained.

LONDON. Oliver Bros. Ltd., 427, Oxford St., W.
Bolton Ltd., 177, Piccadilly, W.
Robt. Scott Ltd., 8, Poultry, Cheapside, E.C.
ABERDEEN. P. McGee, Bridge St.
BARNSLEY. Turner & Charlesworth, Cheapside.
BIRMINGHAM. John Rindon & Co., High St.
BOLTON. H. Eckersley, 13 Bradshawgate.
BRADFORD. Skelton's, Market Sq.
BRISTOL. T. C. March & Son, Regent St.
CARDIFF. Jothams Ltd., St. Mary's St.
DUNDEE. Draffen & Jarvie Ltd.
EDINBURGH. Stark Bros., South Bridge.
GLASGOW. Arnell & Yuill, Gordon St.
GRIMSBY. T. Dutton, Victoria St.
HUDDERSFIELD. Dawson & Sons, 22, New St.
LEICESTER. Wm. Salt, 54, Granby St.
LIVERPOOL. W. Cochrane, Lord St.
MANCHESTER. Craston & Son, Oldham St.
NEWCASTLE-ON-TYNE. Emerson Robson, Grey St.

Write for 1922 Catalogue, giving full range and prices of garments, etc., together with name of nearest retail depot,
THE CELLULAR CLOTHING CO. LTD., FORE STREET, LONDON, E.C.2.

ADMIRALTY CHARTS

THE LATEST EDITIONS OF CHARTS, PLANS, & SAILING DIRECTIONS, PUBLISHED BY THE ADMIRALTY, CAN BE HAD FROM

J. D. POTTER,

Admiralty Agent for Charts, & Publisher of Nautical Books,

145, MINORIES, LONDON, E.1

Official Catalogue of Admiralty Charts, Plans, and Sailing Directions, a vol. of 330 pp., with 45 Index Charts (gratis).

On the Correction and Use of Charts, Light Lists, and Sailing Directions, a vol. of 40 pp., royal 8vo; bound red cloth (gratis).

Spinet

The SUPER CIGARETTE

Finest Golden Virginia.
OVALS, CORK-TIPPED.

20 for 1/6
Also 50's & 100's

The Pipe Tobacco de Luxe

Spinet The SUPER Mixture

2/2 per 2 ozs.

In enamelled pocket tins.

BENJAMIN EDGINGTON

TENTS for MOUNTAINEERING

The "ALPINE" or "WHYMPER" TENT,
as supplied to Mr. Ed. Whymper.

The IMPROVED ALPINE TENT,
as supplied to the
MOUNT EVEREST COMMITTEE.

The "MUMMERY" TENT as used by
Dr. & Mrs. Bullock Workman,
Dr. T. G. Longstaff, &c.

RUCSACS, SLEEPING BAGS, CLOTHING, &c.

S. W. SILVER & CO. AND BENJ. EDGINGTON, LTD.,

1, DUKE STREET, LONDON BRIDGE, S.E.
AND
KING WILLIAM HOUSE, EASTCHEAP, E.C.

Telegrams: "Silverboom Bilgate, London." *Telephone:* Minories 1412.

ELDER DEMPSTER LINES

— TO AND FROM —

WEST AFRICA

By the Steamers of the . . AFRICAN STEAMSHIP CO. *and*
THE BRITISH AND AFRICAN STEAM NAVIGATION CO., LTD.

Regular Services between

LIVERPOOL, LONDON, HAMBURG, ROTTERDAM, ANTWERP, MONTREAL, NEW YORK, and WEST AFRICAN PORTS.

CANADA to SOUTH AFRICA.

LONDON and LIVERPOOL—GALVESTON.
NEW ORLEANS, GALVESTON—LIVERPOOL and HAVRE.

ELDER DEMPSTER AND CO., Limited.

Head Office: COLONIAL HOUSE, LIVERPOOL.

4, St. Mary Axe, LONDON, E.C.3. 30, Mosley Street, MANCHESTER.
CARDIFF. HULL. BIRMINGHAM. HAMBURG. GALVESTON. NEW ORLEANS. MONTREAL.

Printed by William Clowes & Sons, Limited, London and Beccles, England.

T,
r.
n,
0.
420.
S
P,
S.
d.
ER.
AL.